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## THE EFFECT OF CODABILITY UPON THE AFFERENT AND EFFERENT FUNCTIONING OF LANGUAGE\*

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LEONARD W. DOOB

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### A. INTRODUCTION

A priori reasoning (Whorf, 1940) as well as linguistic (Lee, 1944) and experimental (Carroll and Casagrande, 1958) evidence suggest that the structure of a person's language often affects his perception and the subsequent encoding of his verbal report. What may be called the prior or afferent effect of language upon perception undoubtedly falls along a continuum, at one end of which that influence is overwhelming and at the other end zero or close to zero. Unlike English, for example, the Luganda language compels its speakers to note whether an action in the past occurred within or before the last 24 hours if they would report the event: verbs can be changed from the present to the imperfect tense only by inserting one of two distinctive infixes which dichotomize past time around the reference point of a day ago. The immediate sensation of pain from a deep wound, on the other hand, is probably independent of the sufferer's native language. In the first instance, the language afferently affects perception like any other previously established set; in the second, the experience comes exclusively from a nonlinguistic source. After linguistically or nonlinguistically induced perception has occurred and other mediating or mediated responses have been aroused, language may have a subsequent or an efferent effect whose magnitude varies from large to small. When the results of the encoding is a verbal response, then language must exert a major influence: the *S* who knows only English and who is asked to report what he has perceived is utterly dependent upon English words and English grammar.

In practice it is not easy to establish an operational distinction between these afferent and efferent effects of language since usually the investigator has access only to a verbal report which may reflect both the manner of perceiving and the encoding. The need for the distinction, however, becomes acutely evident when the following question is raised: aside from the vocab-

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ulary and the structure of a language, what other attribute provides a basis for predicting the way in which people perceive and then encode their perceptions? One reply suggests that the various categories of a language differ with respect to "codability." Highly codable categories, evidence from an experiment suggests, are short; they are relatively quickly evoked; and they tend to be consistently utilized by the same person over time and by the speakers of the language at a given moment (Brown & Lenneberg, 1954). Such codable categories, having been frequently aroused in the past, are readily "available" and hence affect perception and behavior. Brown (1958, pp. 234-236) has commented upon perhaps the most popular illustration from modern psycholinguistics:

Whorf . . . notes that the Eskimo lexicon uses three words to distinguish three varieties of snow for which English does not have three single-word equivalents. We should use *snow* for all three . . . When the Eskimo steps from his igloo in the morning, I expect him to see the snow falling into one or another of his single-word-named categories. For the American who is only able to name these categories with a phrase (low codability) I do not expect such ready categorization of snows. . . .

This illustration of Whorf makes a very obvious but implicit assumption, viz., that there is snow outside the igloo for the Eskimo to perceive. The Eskimo categories for snows may be more codable than those for grass but presumably, although used frequently and leading speakers of that language to expect snow, they are not applied to grass. What is perceived, one is a little embarrassed to remind oneself, depends also upon the stimulus; and solid experimental studies (e.g., Grant & Curran, 1952; and Heidebreder *et al.*, 1948) have demonstrated that *Ss* come to perceive some stimulus attributes more readily than others. In fact, a linguist like Greenberg (1954) suspects that inferences from linguistic to nonlinguistic facts can be validly inferred with no "better than chance predictability." To improve what may be called the *codability hypothesis* of Whorf and Brown, consequently, the following *working hypothesis* is proposed: Category codability is more likely to affect efferently the encoding of the perceived attribute of a stimulus than it is afferently the selection of the attribute to be perceived.

## B. METHOD

The working hypothesis has been formulated *after* performing a series of experiments during the summer of 1959 among African children and a small number of adults, all of whom belong to the section of the Ewe tribe living

in that part of Togo which is within the political boundaries of Ghana.<sup>1</sup> The studies were inspired and guided by the fact that the Ewe language has the following features which relate to codability:

1. Like many African languages, Ewe codes colors somewhat differently from English. Most colors can be expressed by means of what may be called a verb (one word, combined with a number designation, means "it is white") or a phonemically different adjective (the form of "it is" is followed by the other word for "white"). Either as verbs or adjectives three pairs of terms have roughly the same referents as in English, but are different in the following respects:

a. *Red* and *green*: the distinctive words have, respectively, one and two syllables.

b. *Yellow* and *brown*: each is expressed by means of a distinctive phrase having five syllables; there is no verb form.

c. *Black* and *blue*: a two-syllable word may be applied to colors ranging from pitch black to dark grey and including blue; the term may be modified by another word to restrict the area of "darkness" to which it refers, but it need not be.

2. There are distinctive words for *large* and *small*; in each case, an adjectival form has one syllable, a verbal form two.

3. The word for *color* has four syllables, that for *size* three.

In brief: the terms for two colors (red and green) and for the description of size (large and small) have high codability, those for two other colors (yellow and brown) have low codability. In spite of its brevity, the term for black and blue has low codability: in situations in which the two colors must be distinguished, it refers equally well to both colors until its length in effect is increased through the addition of a qualifying word.

As a result of the exigencies of field research (Doob, 1957), procedures were developed during a very restricted period of time, and they had to be quickly modified when the results unfolded:

---

<sup>1</sup> On field trips in Africa I think that I realize, more forcefully than at any other time, my dependence upon kind people for intellectual guidance and, it often appears at the moment, almost for simple survival. I would declare deeply and unperfunctorily, therefore, that without the help of Victor Hanson, A. F. Menka, Godfried Mortty, and Walter Trost, and particularly too of Gilbert Ansre and Andrew Taylor, this study could not have been more than a fantasy. At Yale University Carl I. Hovland and Patricia N. Kafes have constructively criticized earlier drafts. The study was supported in part by the National Academy of Sciences, National Research Council, under Contract No. Da-19-129-AM-1309 with the Quartermaster Research and Engineering Command. U.S. Army.



### 1. *Size vs. Color Test*

To determine whether the codability of Ewe categories affected the selection of the attribute of a stimulus, Ss were presented successively with three pairs of flat cardboard and were asked to indicate "in what way these two pieces are different." The pieces of a pair differed with respect to color and size: colors were paired as indicated above in the description of the Ewe language; one square of cardboard had an area of 4 square inches, the other of 16 square inches. The brightness of the color was not controlled. The size of the square on which each color appeared and the order in which the pairs were presented were randomized. The investigator's carefully rehearsed interpreter tested the Ss one at a time; half were addressed in English and the other half in Ewe. The investigator was present and recorded (a) the actual response either directly or through a coded translation and—in the first group named below—(b) the reaction by means of a conspicuously displayed stopwatch. Successive Ss consisted of:

a. Sixty-nine students in a secondary school: 41 were in the first year (mean age of 13), 28 in the fifth (mean age of over 17). Slightly less than one-half were randomly addressed in English, slightly more than one-half in Ewe.

b. Nine children in a primary school: 6 from the third grade (mean age slightly over 9) and 3 from the first (all were 6). Testing was only in Ewe.

c. Nine adults in a somewhat remote Ewe village. Only one had had formal schooling (three years), and all stated and revealed that they knew no English. The test was part of a longer schedule with another research objective.

d. Twenty-six children in a primary school: all came from the fourth and fifth grade (mean age between 10 and 11) and possessed a fairly good knowledge of English. The Test was part of a longer schedule mentioned below; one-half were addressed in Ewe, the other in English.

### 2. *Naming of Colors and Other Referents*

To explore the manner in which pre-selected attributes are encoded, 54 of the 69 secondary-school students were shown immediately after the Test the same six colors, one at a time and in random order, and asked to name them; and the 26 children from the fourth and fifth grades in the primary school were asked to state their age, to count, to name kinship terms, etc. In each instance half of the Ss were addressed in English, and half in Ewe.



## C. DEDUCTIONS

If category codability really plays the important role which is ascribed to it by the codability hypothesis, then the Test should have the following outcome: the categories *large-small* should occur as frequently as red-green but more frequently than *yellow-brown* or *blue-black*. For *large-small* and *red-green* are both short and unequivocal; whereas *yellow-brown* is longer, and *blue-black* either ambiguous or longer. The predicted differences, moreover, should be more pronounced when Ss respond in Ewe than in English, for the differences in codability occur in the former but—except for the word *yellow*—not in the latter language. From still another standpoint the hypothesis might possibly anticipate that the category of *size* would appear more often than that of *color* since the former is one syllable shorter than the latter; or it could be argued that color and size responses should occur with virtually equal frequency.

In contrast, the *working hypothesis* of this paper suggests that codability should not necessarily determine the attribute of the stimulus that is perceived; hence, for example, even in Ewe the category of *large-small* may not occur as frequently as *red-green*. When once an attribute of a stimulus is perceived or recalled symbolically, however, then the most codable categories should be expected to appear. The hypothesis cannot specify the nature of those categories.

## D. RESULTS

The results of the Test in the secondary school are given in Table 1 which shows the percentage of Ss in a given category who *first* reported

TABLE 1  
PERCENTAGES OF COLOR RESPONSES BY LANGUAGE AND SERIAL POSITIONS  
(Secondary-school Ss)

	Color pairs		
	Red-green	Yellow-brown	Black-blue
<i>In Ewe</i> ( $n = 37$ )			
1st	83	50	82
2nd	81	83	67
3rd	86	80	63
total	83	73	73
<i>In English</i> ( $n = 32$ )			
1st	78	75	86
2nd	90	91	82
3rd	92	84	83
total	87	84	84
Grand total	85	78	78

that the pairs differed with respect to color, either by mentioning the two colors by name or by stating that they differed with respect to the attribute of "color." The data are broken down by the language in which Ss were addressed and, within each language, by serial position to show whether experience in the testing situation had any effect. No one of the differences is statistically significant. Under all conditions except one, the majority of the Ss reported a difference in color. Although the *N*'s of the subgroups are very small, the trend of the differences lends some slim support to the deductions derived from the codability hypothesis. In the Ewe language, size was noted most frequently on the first trial when the codability of the colors was low (yellow-brown but not blue-black); and it was noted least frequently for all positions when the codability of the colors was high (red-green). In English, where sizes and colors possess roughly the same codability, the similar trend is perhaps less marked. Additional analysis has shown that there is no significant difference in the responses of the younger and the older Ss whose experience with English or Ewe color terms correspondingly varied.

The modal tendency of Ss was to use a name like "red" for each card in the pair rather than to specify the attribute—"color" or "size"—in which the two differed. Of the color responses only about 15 per cent referred to the attribute, regardless of the colors that were involved; of the size responses, about 30 per cent referred to the attribute for the red-green and the blue-black pairs and 60 per cent for the yellow-blue pair. The tendency for the attribute to be used more often for size than for color is significant only for yellow-brown. The attribute appeared more frequently in English than in Ewe in all three combinations, but the differences are not quite significant at the .05 level.

A more critical test of the deductions from the codability hypothesis as such consisted of repeating the experiment among the children in the primary schools and among the adults who knew, respectively, little or no English: presumably for them only differences of codability in Ewe could function afferently. The results were unanimous: every one of the 9 children in the first two grades of the primary school and every one of the 9 adults reported color on all three trials. These groups, consequently, were not more extensively sampled. Instead a deliberate effort was made to induce the 26 Ss in the primary school to perceive size on the Test by compelling them to note and report that attribute on a previous trial. All of them first saw two *grey* squares of the same differing sizes as those on the Test itself; then, when this strategem failed to produce reports of size on the Test, still

another trial was added which consisted of an intact film package (#120) and one cut in half (rows 5 and 6, Table 4). After these two preliminary trials, only two of the 18 Ss, both of whom had been addressed in English, indicated on the Test that their first impression involved size.

Color, therefore, was the attribute which was predominately perceived and reported, in spite of the low codability of two of the three color pairs in Ewe. The finding appears consistently in two grades of the one secondary school, in four grades of two primary schools, and in the adult group. When viewed with a sign test, the trend is highly significant.

Often, however, the same Ss volunteered the observation as a second response or as an after-thought that the pieces also differed in size. *Without a single exception* in all the groups it was possible to elicit that response of size by means of patient probing which, to avoid introducing a bias, had to be generally confined to the third and final trial. A cultivator who had never been to school and who estimated his age to be 34, for example, was shown the small blue square and the large black one:

*Informant:* This one is more "blue" [English word] than this.

*Investigator:* Are they different in any other way?

*Informant:* No.

*Investigator:* No other way?

*Informant:* This one is darker.

*Investigator:* Yes, but are they not different in some other way?

*Informant:* One is bigger than the other.

Since the attribute of color was perceived, the working hypothesis suggests, the encoding of responses should be markedly affected by the codability of the various categories. The color responses from the primary schools and the secondary school are reported in Table 2; the figures represent the number of Ss making modally the response indicated by the heading of the row. The decimal point reflects the fact that in a few instances an S named one color in English, the other in Ewe. Very few of the primary-school children, the Table shows, could name the colors when addressed in Ewe. Instead most of them used the English names; and of those who did reply in Ewe, almost half—as indicated in the row titled "colors compared"—referred to the attribute of "color" or made statements like "one is darker than the other." Every S addressed in English who reported color used English color terms.

A majority of the secondary-school children, on the other hand, responded with Ewe color categories when addressed in Ewe. They used either English or the response of "color" when addressed in English. Eight of the nine adults who knew no English used an English category at least once.



TABLE 2  
NUMBER OF Ss MAKING VARIOUS TYPES OF COLOR RESPONSES

	Primary schools			Secondary schools		
	Red-green	Yellow-brown	Blue-black	Red-green	Yellow-brown	Blue-black
<i>In Ewe</i>						
Colors named	5.5	5.5	2.5	27	22	20
Colors compared	3	4	3	2	0	2
Colors named in English	13.5	12.5	16.5	2	5	5
Total <i>n</i>	22	22	22	31	27	27
<i>In English</i>						
Colors named	11	11	11	19	20	20
Colors compared	0	0	0	9	7	7
Colors named in Ewe	0	0	0	0	0	0
Total <i>n</i>	11	11	11	28	27	27

A similar result is evident when an examination is made of how the same secondary-school Ss named the six colors when asked later to do so. In Table 3 the responses of the 28 addressed in Ewe and of the same number addressed in English are tabulated by color. In Ewe the highest number

TABLE 3  
NUMBER OF SECONDARY-SCHOOL Ss NAMING COLORS IN VARIOUS WAYS

	In Ewe ( <i>n</i> = 28)			In English ( <i>n</i> = 28)		
	Correct in Ewe	Analogy	Incorrect, don't know	Correct in English	Analogy	Incorrect, don't know
Red	24	1	2	1	24	3
Green	20	4	0	4	24	4
Yellow	9	14	0	5	11	15
Brown	2	15	2	9	11	15
Blue	1	3	2	22	22	3
Black	23	0	1	4	26	2

of shifts into English occurred for the color blue; the other two colors whose categories have low codability (yellow and brown) elicited relatively few technically or literally correct responses; but black caused little trouble. In English the colors were correctly named; yellow and brown tended to be expressed by means of an analogy.

The two significant differences which emerge from an analysis of reaction time among the secondary-school Ss show the expected relation with codability as based upon category length and ambiguity. In the first place, for the yellow-brown pair in the Test—and only for that pair—the reaction



time was greater when the category of color rather than that of size was employed. Then both in English and in Ewe the reaction time to naming the color blue and the color brown was greater than that to the other colors. Since modal reaction times tended to be between 3 and 4 seconds, perhaps more differences would have emerged with a less crudely controlled method of measurement.

Finally, attention may be turned to the primary-school Ss who were given the series of questions which asked them in effect to provide terms for referents that were either present ("How many pens are on this table?") or symbolically recalled ("What does a person call someone who is his mother's sister?"). The order of the questions is given in Table 4 which specifies in detail how the 13 Ss addressed in Ewe and the equal number addressed in English replied. The results indicate that, virtually except for colors, the Ss used the language in which they had been addressed and that, except for kinship terms, the patterning of responses in each language was identical. Whenever an S shifted from Ewe to English, he produced a correct response; of the 9 shifts in the reverse direction, only 3 were incorrect. Colors caused trouble (Rows 7, 15-18), though less so in English; once again, English terms tended to appear when Ss were addressed in Ewe. Numbers fared equally well in either language (Rows 2-4, 14), but a high proportion immediately shifted to English when asked to count from 1 to 10 (Row 4). Kinship terms were included in the schedule since in this respect Ewe is much more precise than English; instead of referring to the various relatives with the single term "aunt," it has distinctive terms for father's sister, mother's older sister, and mother's younger sister, and the same terms are applied with similar discrimination to the wives of uncles. Ss had trouble with the questions: usually the first modal response was to name a specific aunt or uncle and not the generic term. In Ewe they encoded incorrectly about as frequently as correctly, but in English they were seldom correct, and often—significantly so each time in the case of uncle—they did not respond at all (Rows 10-13).

#### E. DISCUSSION

The Test in which Ss could have perceived a difference in size or one in color caused the majority of them to perceive color. In the secondary-school group, the color response did occur most frequently in the red-green situation, as the codability hypothesis anticipated; yet the difference is not statistically significant. These findings suggest that category codability alone does not afferently determine perception, rather other factors in the stimulus

TABLE 4  
NUMBER OF *Ss* NAMING REFERENTS IN VARIOUS WAYS

	In Ewe				In English				In Ewe:	
	Right	Wrong	D.K.	In English <sup>a</sup>	Right	Wrong	D.K.		In Ewe:	
									Right	Wrong
1. Age	12	0	0	1	13	0	0		0	0
2. No. of sibs	13	0	0	0	13	0	0		0	0
3. No. of pens	12	0	0	1	12	0	0		1	0
4. Counting	8	0	0	5	13	0	0		0	0
5. Size perception (1)	9	3	0	1	11	2	0		0	0
6. Size perception (2)	7	1	0	1	7	1	0		1	0
7. Size vs. color <sup>b</sup>	4	1	0	8	12	1	0		0	0
8. Name of a flying animal	11	0	1	1	8	1	2		1	1
9. First day of week	10	2	0	1	4	8	1		0	0
10. MoSi <sup>c</sup>	6	6	1	0	4	4	5		0	0
11. FaSi <sup>c</sup>	7	4	1	1	1	4	8		0	0
12. MoBr <sup>c</sup>	5	6	1	1	3	4	5		0	1
13. FaBr <sup>c</sup>	6	6	1	0	4	2	7		0	0
14. Number after 9	12	1	0	0	8	2	3		0	0
15. Color of blood	8	1	1	3	6	2	3		1	1
16. Color of grass	3	2	0	8	9	1	1		2	0
17. Color of "my skin" <sup>d</sup>	5	1	4	3	12	0	1		0	0
18. Color of a leaf	1	4	1	7	8	1	4		0	0

<sup>a</sup> All responses "right."

<sup>b</sup> Performance on two or three of the three trials.

<sup>c</sup> *Mo* = mother, *Fa* = father, *Si* = sister, *Br* = brother.

<sup>d</sup> Of the interpreter, dark brown.

situation must operate. After perceiving color, it appears that the Ss tried to be as accurate as possible, and the particular coding possibilities which were opened to them depended upon the language or the languages which they knew. This fierce, almost pathetic struggle to encode accurately is illustrated by the protocol from a woman clad at the time only in a very brief, plain-colored skirt:

*Yellow-blue:* I see a difference between this, a red and a dark one.

*Red-green:* a dark thing and a red one.

*Blue-black:* I see the difference, this is dark, that too is dark, but it is like this; it puzzles me; I have lost the names of them.

All the Ss, observation suggests, were motivated to respond as accurately as possible. This was not a situation which challenged their cultural values or their knowledge of English, rather it was one in which an obviously well-educated and faultlessly dressed Ewe (the interpreter) and a European were testing or timing them. Accuracy demanded a quick reply that encoded their perception. The social convention of their country, where many distinct languages flourish side-by-side, required them to encode in the language of the interview. The secondary-school Ss, it must now be pointed out, were studying Ewe as a subject in their school; hence, although their knowledge of English was farther advanced, many more of them could and did respond in Ewe than was the case among the primary-school Ss. Even they, nevertheless, had trouble with the Ewe categories for yellow, brown, and blue.

It appears, however, that Ss who knew English shifted into English when they found that language more precise in the situations that involved color and when they had had inadequate experience with the Ewe terms. They did not shift in the reverse direction, even when Ewe offered more precise kinship names, it may be surmised, either because they understood only with difficulty the questions which they were being asked or because they were not accustomed to inject Ewe terms into an English conversation. At the same time, the Ss' choice of an encoding device also reflected a general trend among speakers of Ewe. It has been noted, for example, that many Ss avoided the ambiguity caused by the fact that a single term in Ewe may be applied to both black and blue not by qualifying that term with other Ewe words (which the language easily permits) but by using it to designate only black and then selecting the English term for blue. According to well-informed Ewes, that too is the tendency within the Ewe language; in fact, they add, some Ewes now no longer recognize the sound *blue* as an English



word. A sensitive Ewe, temporarily studying in New England, has commented on the statements of the present paragraph:

With the coming of Europeans and their language [to Togo], both the color "blue" and its words—in German, French, and English—increased in use. You would be surprised to know that only few indigenous flowers are colored blue. You would be even more surprised that it is here in America that I saw my clearest and bluest sky<sup>2</sup>. . . . The whites also required the use of "blue" as a color concept. The word "blue" was brought into the language—not only in schools, but in gardening, selling cloth, use of paint for walls by masons, and the like. It has been happily accepted. It is not that we were blind to colors; just our use of words for color concepts differed! An apologetic!

Likewise other authorities, both Ewe and European, report anecdotally that the Ewe people indigenously show "little interest" in color. There is, for example, virtually no color in their homes, and the colorful cloth which men and women now wear was introduced by Europeans. Even though at the time of the research the early school grades were being taught in Ewe, apparently the Ewe color terms were relatively unknown or little exercised. *In spite of this cultural de-emphasizing of color*, the children and the adults perceived color. The primary-school Ss, who had not studied Ewe, were compelled, consequently, to use the more highly codable English categories or else refer to the attribute of "color" if they were accurately to report their perception. For unknown reasons it appears that the latter encoding device was seldom utilized; hence those being addressed in Ewe found the categories which encoded their perception accurately but only through the somewhat circuitous expedient of temporarily abandoning their own language and the language of the interview.

The struggle of these Ss to render faithful reports suggests not only that codability is likely to have less of an afferent than an efferent effect but also that in this latter respect it functions in conjunction with the drive behind the encoding process. If the individual is motivated to compose a sonnet or to tell a lie, his verbal report may be long, slow, unreliable, and idiosyncratic. If, as in the present studies, he is challenged to be accurate, he will use those categories which may be highly codable and readily available, which must be within his experience, and which appear most suitable under the prevailing cultural and situational circumstances.

<sup>2</sup> I disagree; skies in Ghana are bluer; an impartial investigation of both negatively ethnocentric claims seems imperative.



## F. SUMMARY

In the Togo section of Ghana 113 children, adolescents, and adults were asked to indicate the difference between pieces of cardboard which in fact differed with respect to size and color. Some were addressed in English, others in their own language (Ewe). The adolescent group also subsequently named six colors, and some of the children provided names for other referents that were present or symbolically recalled. Since some color terms in Ewe vary in length and in the range of colors to which they refer and since Ewe terms for indicating size are short, a hypothesis based exclusively upon the "codability" of categories would anticipate (a) that size would be perceived progressively infrequently as the color terms become longer or less discriminating and (b) that this effect would be especially prominent for Ss responding in Ewe rather than in English. Neither expectation was confirmed: a clear-cut majority reported color as their first response. This finding; the data from the Ss on naming colors and other referents; and the banal observation that all perception is affected by stimuli lead to the working hypothesis that category codability as a measure of linguistic structure which influences behavior is more likely to affect efferently the encoding of the perceived attribute of a stimulus than it is afferently the selection of the attribute to be perceived.

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## THE ROTATION OF DRAWINGS BY ILLITERATE AFRICANS\*

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### A. INTRODUCTION AND PROBLEM

Rotation is the term used to describe the fact that subjects often make their reproductions, when drawing or when manipulating the Kohs Blocks, in an orientation which is different from that of the model, though otherwise the reproduction is made correctly (see Figure 1). It was decided to investigate the performance of illiterate Africans because the conditions affecting this aspect of the drawing function were sufficiently well established to permit the elaboration of a fairly precise conception of its cause. The main findings concerning rotation are the following:

1. Brain-damaged subjects, with Kohs Blocks (10) (13) or drawings (16), rotate more than non-brain damaged subjects.
2. The amount of rotation varies in accordance with three laws of organization of the material which has to be copied (10, 13): (a) When the line of symmetry of the design to be copied is at an angle to the vertical axes of the visual field (see Nos. 2, 3, 6, and 7 of Figure 2) more rotation is produced than when it is parallel to that axis (see Nos. 1, 4, and 5 of Figure 2). The line of symmetry is the imaginary line which divides a design into two equal and mirrored halves. (b) When the design is in a diamond orientation (see Nos. 1, 2, 3, 4, 6, and 8 of Figure 2), more rotation is produced than when it is in a square orientation (Nos. 5 and 7 of Figure 2). (c) When the

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card on which the design is placed is in a diamond orientation, more rotation is produced than when it is in square orientation. The cards used in these experiments are white and each of them is 6" by 6" in size. The designs are each 1" by 1" in size. The relative strength of these three laws has tended to vary somewhat from one investigation to another, and from the block design to the drawing test (16).

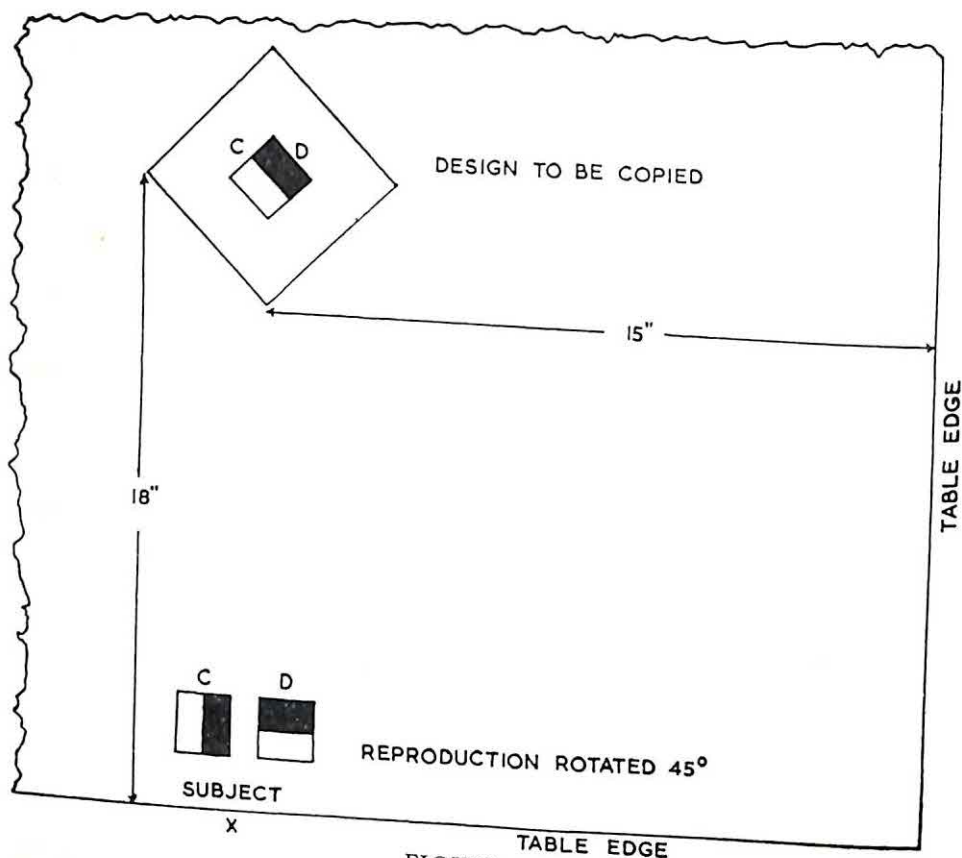


FIGURE 1  
THE ROTATION EFFECT

3. There is negative correlation of rotation with Intelligence Test score, i.e., the more a subject rotates, the lower his intelligence test score. The correlation never rises above .6 (14).

When equated for intelligence brain-damaged subjects still rotate less than non-brain damaged subjects (13, 16).

4. An explanation of the rotation effect had been advanced and has been



tested in a number of experiments (11, 12, 13, 15). The essential points of this explanation were as follows: (a) That there are two perceptual situations involved in copying a design: first, the target situation defined by the abstract design to be copied and the card on which it is painted, and second, the reproduction situation which is defined by the pad on which the design is to be copied, the table edge, the front of the subject's body and hands. These two situations were too far apart in the experimental situation to influence each other simultaneously. (b) The degree of rotation would be affected by the extent to which the directional organization of the two situations differed. In the target situation the subject would tend to perceive a square, with either side "C" or side "D" as top, a tendency reinforced by the orientation of the card and the angle of line of symmetry. In the reproduction situation the subject would tend to perceive "top" at right angles to his body and table edge. Therefore when he looked at the pad to make what he had perceived in the target situation he would tend to make a square, i.e., he would tend to rotate. Hence the three laws affecting rotation.

5. The degree to which rotation takes place is a function of the availability of correcting stimulation and associations. This is analogous to the fact that an aeroplane passenger, when flying through fog, would tend to perceive the interior of the aircraft as upright when in fact the aircraft was banked. If, for any reason, the sensory input and correcting associations were restricted, as in the case of brain-damaged patients, then the effects of differences in the directional organization of the target and reproduction situation would be increased. Five experiments have been carried out on normal subjects in which their visual stimulus has been considerably reduced by wearing a special restrictive mask. In all the experiments the normal subjects were made to rotate as much as brain-damaged subjects, more than normal subjects under unrestricted conditions.

## B. METHOD

### 1. *General Procedure*

Because of shortage of time, only the first eight of the 40 items of the Drawing Rotation Test were administered. The subjects were 20 illiterate Africans and 17 educated Africans who were inhabitants of the Central African Federation. For purposes of comparison the previously gathered data from five other groups of English subjects were then examined. These groups were: a normal group, a brain-damaged group of psychiatric patients, a group classified as high grade mental defectives, a mental defective group between the *IQ*'s of 55 and 79, and a brain-damaged mental defective group.

## 2. *Description of Sample*

### *a. Illiterate Africans.*

(1). *Method of selection.* The illiterate Africans consisted of 14 out of 20 male sweepers working in the location of one of the large towns of Southern Rhodesia, and who completed the drawings according to criteria described below. Sweepers were chosen because they were said to be the people who had most recently left the reserves. The subjects were merely told by their overseer, who subsequently acted as interpreter in the test, to come to the office. It was thought this method was the simplest and most easily reproducible in a preliminary study, and one which was the closest reproduction of ordinary black-white social relations.

(2). *Origin.* All 14 subjects came from Nyasaland, of whom 13 were members of the Cewa tribe and one of the Ngoni.

(3). *Age.* Only two of the subjects were able to give their age, and one of these gave his age as 27 when he looked 45. The second age was recorded. The mean age of the remaining subjects, estimated by the interpreter, except for the inadvertent omission of two subjects, was 28 years, range 18 to 44 years. The lack of precision of these data is not very important as there is no correlation between age and rotation for subjects below 50 years of age (16).

(4). *Education.* Nine of the subjects said they had had no education, and had never handled a pencil before. Four said they had been educated for one year, and one for seven years. This last subject said he could read and write in his own language.

(5). *Vocational experience.* Six of the subjects had worked for wages for one year or less, two for between one and two years. The remaining periods of employment were: 5, 6, 10, 17, 26, and 27 years.

(6). *Organicity.* All the subjects denied having had bilharzia, a widespread infection which is supposed to damage the central nervous system, or having experienced unconsciousness. These denials, like all the information obtained from this sample, cannot be taken at face value. They might be part of a general ignorance of the same order as the ignorance of age, or they might arise from understandable suspicions of the experimenter's purpose.

(7). *Behaviour.* Only two of the subjects failed to hold the pencil correctly, one showed overt signs of anxiety like shivering or shaking, and a further four subjects required persuasion during the test. The difficulties varied from complaining about the difficulty of the task to actually stopping and saying they could not continue.

*b. Educated Africans.*

(1). *Method of selection.* These subjects, volunteers, consisted of all 15 of the African members of the staff of a large elementary school, and two members of the staff of another school (six females and 11 males). The headmaster explained to them only the general purpose of the study. Absolute anonymity was assured.

The ages (known for 16 subjects) ranged from 22 to 40, the mean being 28 years.

(2). *Origin.* Twelve of these 17 subjects were drawn from the Shona speaking peoples, of whom five were Nyika, two Zezuru, one Korekare and Mbiro. There was one subject from each of the following tribes: Ndebele, Zulu, "Nyasa", Sotho, and Nyembani.

(3). *Education.* The average period of formal education, known for 16 subjects, was 12 years, range 8 to 15 years. All spoke English fluently.

(4). *Vocational experience.* Each of the subjects had had a number of years working in the educational system in some capacity, usually teaching.

(5). *Organicity.* Ten of the subjects admitted to incidents or a history consistent with the possibility of brain damage, such as bilharzia, and unconsciousness through illness or accident.

(6). *Test behaviour.* All the subjects appeared to be thoroughly co-operative and interested.

*3. English Controls*

The 21 English controls were all the subjects between *IQ*'s of 85 and 115 found in the groups of subjects previously tested by Yates (16), Kessell (7), Campbell (5), and Beech (2) in the course of their own investigations. The *IQ*'s were prorated from the three subtests: Vocabulary, Similarities, and Block Design. The mean was 104. They had, in response to a special questionnaire, denied that they had ever been made unconscious by a blow on the head, in any way sought psychiatric attention, or knew of a history of difficult birth. The final group of 21 subjects consisted of 10 adolescent children from a secondary modern school, 6 student nurses, and 5 assorted employees of the Maudsley and Bethlem Hospitals. Their education was at least up to secondary modern standard. The mean age was 24 years, ranging from 14 to 50 years.

*4. Brain-Damaged Subjects*

Records were available for 25 brain-damaged subjects tested by Yates (16) and Kessell (7) in the course of their own investigations. Their pro-rated Wechsler *IQ*'s were between 115 and 85, their mean being 96. Their mean

8-339

3.9.70



age was 43, ranging from 26 to 49. Practically all Kessell's subjects were of working class origin. Yates gives no data for his subjects.

Period of hospitalization was from a few months to over 20 years.

Most of these subjects must have had a least the equivalent of an elementary school education, and had been, except for the few housewives, in a variety of money-earning employments.

There are no indications of lack of co-operativeness in the testing situation. The diagnoses were somewhat evenly distributed between diffuse lesions like G.P.I. and brain operations such as temporal lobectomies.

### 5. *Certified Mentally Defective English Subjects*

These subjects were drawn from the Manor Hospital, Epsom. They had been given the drawing rotation test by A. Yates.

They were divided into three groups. The first consisted of 6 females and 10 males, "probably not brain-damaged" subjects, with Full Wechsler *IQ*'s between 80 and 106, the mean being 89. The mean age was 24, ranging from 18 to 44 years.

The second group consisted of 16 females and 9 males, brain-damaged subjects, with Full Wechsler *IQ*'s between 55 and 79, the mean being 69. The mean age was 23, ranging from 18 to 31 years.

The third group consisted of 5 females and 5 males, being brain-damaged subjects who were mainly post-encephalitics. Their full scale *IQ*'s ranged from 72 to 97, the mean being 83. The average age was 35 years, ranging from 21 to 45 years.

All these subjects appeared to like being tested.

### 6. *Materials and Procedure*

Each design (first row of Figure 2) was 1" by 1" square and was painted in water colour upon a square card which is 6" by 6". Designs 1, 2, and 6 were placed on cards of square orientation and Designs 3, 4, 5, 7, and 8 were placed on cards of diamond orientation.

The designs were presented to the subjects one at a time, placed on a table 18" from the edge of the table immediately adjacent to the subjects and 15" away from his right-hand edge as is shown in Figure 1. The pad consisted of a lined exercise book, cut in half. It was below the card, which lay on the table while the subject was making the drawing. The order of presentation was always the same as in Figure 2.

The subject was instructed to copy the drawings with a blue pencil, and to indicate by an appropriate stroke which parts of his reproduction were blue.

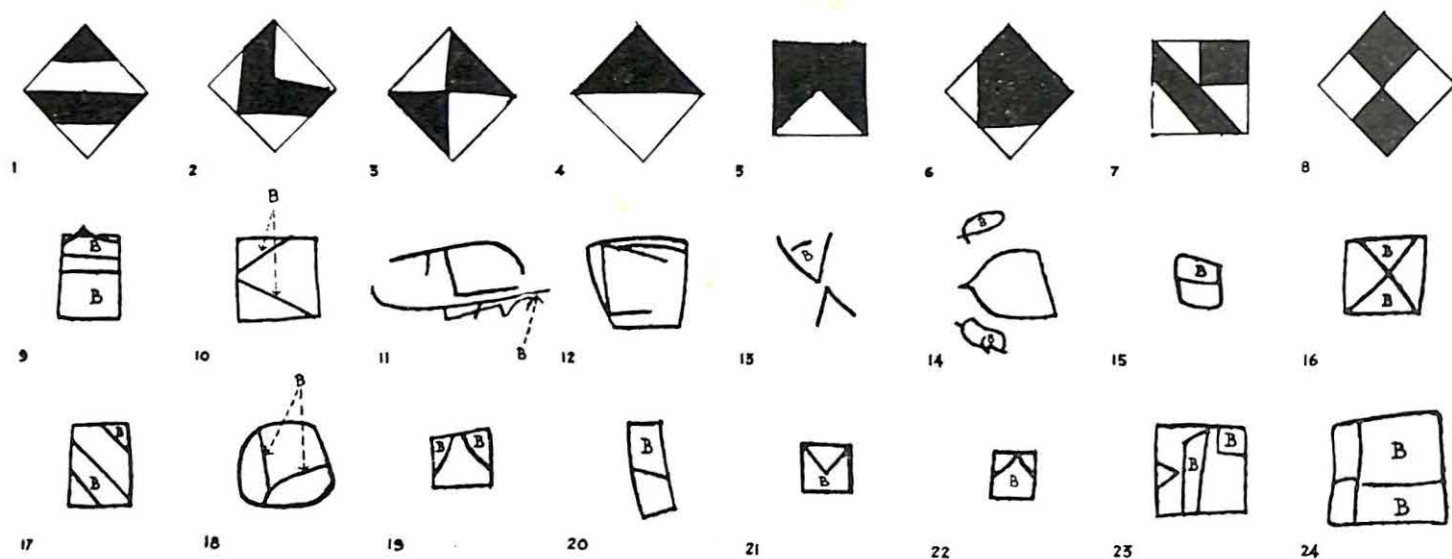


FIGURE 2

## DESIGNS AND REPRODUCTIONS BY ILLITERATE AFRICANS

Nos. 1 to 8 illustrate, in proper order, the designs used in the test. The black areas are blue, while the white areas are yellow.

Nos. 9 to 24 illustrate some of the reproductions made by uneducated Africans. Nos. 9 and 17 are copies of No. 1, Nos. 10 and 18 are copies of No. 2, etc.

Letter B indicates the blue parts of the reproductions. In the cases of Nos. 10, 11, and 18, the subjects indicated the *lines* as being blue.

When he had apparently finished, the experimenter said, "Is that correct?" The trial was completed when the subject said, "Yes." A stopwatch was in evidence. The times taken will not be discussed in this paper.

The illiterate Africans were tested with the aid of an interpreter kindly provided by the Superintendent. The writer was satisfied with the adequacy of the interpreter's understanding of English on a previous social occasion. Before the experiment, the writer instructed the interpreter as carefully as possible on the method of objective administration of the test, with special emphasis on not influencing the subject's actual performance. A similar procedure was adopted by Mrs. E. J. Shapiro, who tested the educated Africans. All of the illiterate Africans, except the first two, were merely required to indicate verbally which they thought were the blue parts of their reproductions.

### 7. *Scoring Methods*

In all previous studies, a drawing, before it was accepted for scoring, had to be easily recognizable as an accurate reproduction of the model, i.e., the outline had to be rectangular and the internal parts relatively correctly placed, as in Nos. 17, 21, and 22 of Figure 2. Not one of the illiterate Africans produced eight scoreable drawings by this criterion. The criterion of acceptability was therefore altered to a drawing with a plausibly rectangular outline, regardless of the appearance of its internal parts. In cases of doubt, the structure of the internal parts was taken into account.

One of the illiterate Africans was excluded, because, for some unknown reason, he had done nine drawings. Finally, 13 were found who, by the new criteria, had eight scoreable drawings and one who had seven scoreable drawings.

Dr. J. C. Brengelmann kindly carried out an independent selection of scoreable drawings on the basis of the new criteria. He selected the same 14 subjects with that same number of scoreable drawings, with agreement on 90 per cent of the total of 152 drawings.

The rotation score for each drawing consisted of the difference between the orientation of the reproduction and that of the target, in degrees. For reasons given elsewhere (16) the angle measured was that of the left-hand side of the reproduction when it was in a square orientation, and the top left-hand side of the reproduction when it was in a diamond orientation. The smaller of the two possible rotations was taken. The excluded subjects did not appear to differ from the others in the sampling characteristics described above.

If, as in the case of No. 16 in Figure 2, it was not possible to identify the



exact orientation, the minimum rotation, given by deviation of the left-hand side from 45 degrees, was scored. The final score for each subject consisted of his total score divided by eight.

Only three of the other groups produced any drawings which had to be scored by the new criteria. The educated Africans produced three, the highest rotation being 58 degrees; the brain-damaged mental defectives six, the highest rotation score being 15 degrees; and the mental defectives, between 55 and 80 *IQ*, one with a rotation of 41 degrees.

### C. RESULTS

The highest average rotation score produced by any subject in the English and educated African groups was 44 degrees. This score was exceeded by seven of the illiterate Africans, whose highest score was 77 degrees. The lowest average rotation score produced by the illiterate Africans was 27 degrees. This score was exceeded by only one brain-damaged subject between 85 and 111 *IQ*, one brain-damaged between 72 and 97 *IQ*, and one educated African.

Logarithmic transformations of the rotation scores were made in order to try to homogenise the variances (Table 1 and Table 2). An analysis of variance produced an *F* ratio of 11.80, significant at well above the .01 level.

TABLE 1  
MEANS AND SD'S OF LOG ROTATION SCORES

	N	Mean	SD
Illiterate Africans	14	1.668	0.147
M.D., 55-79 I.Q.	15	1.196	0.208
Brain-damaged, M.D.	10	1.151	0.212
Educated Africans	17	1.047	0.319
High Grade M.D. $\leq$ I.Q. 80	16	1.034	0.315
Brain-damaged, 85-114 I.Q.	23	1.021	0.417
English Controls	21	0.898	0.197

Six of the "*t*'s", ranging from 4.369 to 7.792, were significant at above the .001 level; they were for differences between the means of the illiterate Africans and of each of the other groups.

One *t*, for the difference between the 55-79 *IQ* mentally defective group and the English normals, was at the .01 level, and one other, between the former group and the educated Africans, was at the .05 level.

The fact that none of the differences between the means of other groups reached an acceptable level has no special implication, as the test was much shortened.

## D. FURTHER INVESTIGATION OF THE RESULTS

### 1. *Comparison with Imbeciles*

As it turned out, many of the uneducated Africans had had long periods of employment, in unskilled occupations, and therefore they might have been low grade mental defectives. To check this point, the first eight designs of the drawing rotation test were given to 32 subjects who had been classified as imbeciles at the Manor Hospital. Of these, 14 were scoreable for rotation, using criteria like those applied to the illiterate Africans. Binet and Wechsler *IQ*'s for 11 of these subjects ranged from 31 to 48, the mean being 40. One of the remaining three subjects had been tested in error and in fact had a Matrices *IQ* of 74. His mean rotation score was 30 degrees. The mean age of the 14 subjects was 28, ranging from 20 to 58 years. The mean of the raw rotation scores was 28 degrees, ranging from 17 to 32 degrees. The raw score mean for the illiterate Africans was 49 degrees, ranging from 31 to 74 degrees. The "*t*" for the difference between the means was 4.47, significant at well beyond the .001 level.

It is worth noting that none of the imbeciles produced fantastic drawings like some in Figure 2.

### 2. *The Lawfulness of the Rotation Effect in Illiterate Africans*

Examination of Table 2 shows that there is a very precise relationship between the organization of the target material and rotation in the data of the Illiterate Africans. The organization is a function of : (a) the two kinds of symmetry, e.g., Design No. 1 and No. 2; and (b) the two kinds of orientation, e.g., Design No. 1 and No. 5 (Figure 2).

Direction of rotation, which occurred in both directions, is not taken into account. The precision of these relationships is an indication of the reliability of the results, and of the existence of precise psychological processes in the illiterate Africans. These will be discussed below.

## E. DISCUSSION AND CONCLUSIONS

The first conclusion is that the final explanation of the relatively high rotation scores of the illiterate Africans will probably have to take into account the psychological effects of being an illiterate African and/or of being an unintelligent African. Of course, interactions with all the other factors to be discussed are possible. There are three reasons for this conclusion: (a) No *one* of the following factors, low intelligence, brain damage, illiteracy, and membership of the African race is a likely explanation because each of these characteristics can be found in at least one of the low rotating groups. (b) A combination of low intelligence, brain damage, and

TABLE 2  
DISTRIBUTION OF ROTATION IN RELATION TO DESIGNS: ROTATION IN DEGREES

Design Nos.	0-15	16-30	31-45	46-60	61-75	76-90	91-105	106-120	121-135	136-150	151-165	166-180
1.	2	1	5	6	0	0	0	0	0	0	0	0
4.	0	1	5	7	0	0	0	0	0	1	0	0
7.	11	1	0	0	0	1	0	0	0	0	0	0
8.	0	1	11	2	0	0	0	0	0	0	0	0
2.	0	0	6	4	0	0	0	0	1	3	0	0
6.	0	0	7	1	0	1	0	0	3	2	0	0
5.	8	0	0	0	0	0	1	0	0	0	0	5
3.	0	0	8	6	0	0	0	0	0	0	0	0



illiteracy is an unlikely explanation because of the low scores of the imbeciles, among whom the incidence of brain damage and organic defects is high. (c) A combination of brain damage and "Africanism" is contra-indicated as a cause because of the high incidence of "Organic" histories among the educated Africans.

The second conclusion arising from the results is that the illiterate Africans are influenced by the same directional features of the target and reproduction situations as are English subjects, but to a greater degree. This is shown by the two main groups of findings in Table 2. First, except for two occasions, the diamond oriented designs were always reproduced roughly as square. One might explain this by saying that the illiterate Africans tended to perceive diamonds in a manner similar to that of Europeanised subjects; but with less modification by surrounding stimulation and relevant associations. Analogous is the report by Bender (3) that American children, up to the age of five years, most frequently draw square oriented designs when copying diamond oriented squares.

Second, one group of rotation scores were higher than any ever observed before. These were the nine rotations of about 135 degrees for Designs 2 and 6 (Figure 2) and the five rotations of about 180 degrees for Design 5, the type of design which produced least rotation amongst the English subjects. All the designs concerned are of rectangular symmetry, i.e., the line of symmetry divides each design into two rectangles. It is possible that in these designs the exact location of top can, under certain conditions, be ambiguous. This idea is checked by the fact that Design 7, though in similar orientation to Design 5, produced very little rotation. Its internal organization seems to be relatively unambiguous because the line of symmetry is a diagonal, and hence the location of top might have been difficult to confuse.

Here one might say that if, for any reason, there is an extreme degree of deprivation of surrounding stimulation and relevant associations, then any ambiguity concerning "topness" in the structure of a target design would materially influence perception.

Such extreme deprivation might have two causes in the case of the illiterate or unintelligent Africans. The first might have been gross disorganization of attention in the testing situation as a result of wild fears about the purpose of the experiment and extreme unfamiliarity with many aspects of the task. Perhaps any English worker in an authoritarian firm, might rotate as much as the illiterate Africans if ordered, without explanation, to carry out the rotation test in front of his foreman.

The second, and not necessarily mutually exclusive cause, is that the culture

of the illiterate or unintelligent Africans did not provide the necessary opportunity for learning which enabled them to make an adequate integration of the directional properties of the visual world, at least in the two-dimensional situation involved in the drawing task. Both types of explanation are obviously testable.

#### F. RELATION TO THE LITERATURE

There are two studies (6, 8) which report considerable rotation by African subjects, but appropriate control groups were not used, and therefore their implications cannot be assessed.

Allport and Pettigrew (1) report that rural Africans, who were said to have had no experience of rectangular windows and doorways, were less affected by the trapezoid illusion than Europeans or urbanised Africans, and hence apparently less sensitive to the directional properties of rectangular shapes. The results reported in this paper give the contrary impression. Only experiment can decide whether this result reflects the partial urbanisation of the illiterate Africans, or a direct contradiction of the results of Allport and Pettigrew.

An over-sensitiveness to acquired properties of a stimulus are indicated by the findings of Beveridge (4) who reported that Africans, when instructed to state how the stimulus appeared to them, tended to see the real shape or size rather than the phenomenal shape or size compared with European subjects.

#### G. SUMMARY

This paper reports the results of the performance of a shortened form of the Drawing Rotation Test by African and English subjects. The Africans consisted of 14 illiterate subjects and 17 educated subjects. The English subjects consisted of 10 brain-damaged, 15 low grade, and 16 high grade mental defectives; 14 imbeciles; and 21 normal and 23 brain-damaged subjects of about normal intelligence.

The illiterate Africans rotated considerably and significantly more than any other group and did so in accordance with precise laws of organization of the target material.

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## CHANGE AND PERSISTENCE IN THE STEREOTYPES OF UNIVERSITY STUDENTS TOWARD DIFFERENT ETHNIC GROUPS DURING SINO-INDIAN BORDER DISPUTE\*

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### A. INTRODUCTION

Although numerous studies of stereotypes toward different ethnic groups have been reported, there are relatively fewer studies available on stereotype persistence and change. It is, however, needless to emphasize how significant the question of stereotype persistence and change has become in the present context of complex international relationships. Stereotypes tend to be modified by local or world events. As situations change, occasions for corresponding change in existing stereotypes arise. A few studies indicating the importance of this factor are those of Dudycha (1), Gilbert (2), Meenes (5), Seajo (6), and Shrieke (7). After reviewing the relevant studies relating to change and persistence of stereotypes, Lindzey (4) writes: "One should not assume . . . group stereotypes are easily modified. . . . It requires unusual political, economic, or social events to modify them on a wide scale" (p. 1024).

### B. PURPOSE

The purpose of this study was (a) to investigate the change and persistence in the stereotypes of university students toward Indians and eight other ethnic groups (Americans, Chinese, English, French, Germans, Negroes, Pakistanese, and Russians) in the context of the present Sino-Indian border dispute, and (b) to see the difference, if any, between the ranking of the nine ethnic groups by the same students on the basis of preference for association before and during the dispute.

### C. METHOD

The study of stereotypes for the period before the Sino-Indian dispute was done in February, 1959, when the relationship between India and China had not become strained, and for the period during the dispute in December,

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1959, when the tension had become sufficiently intense. Subjects, materials, and procedures were the same both before and during the Sino-Indian border dispute.

### 1. *Subjects*

The subjects were 100 male and 100 female students of Patna University selected at random from both undergraduate and postgraduate classes. It may be mentioned here that the data for the period before the Sino-Indian border dispute were analysed for sex differences and reported earlier (8). As no significant difference was found between males and females in both the stereotypes and preferential ranking for association, analysis on the basis of sex difference was not deemed necessary for this study.

### 2. *Materials*

A list of 80 characteristics was prepared on the basis of the materials obtained from different studies of stereotypes and the pilot study done with 25 university students as subjects in which they were asked to state as many characteristics as they thought typical of the following nine ethnic groups: (a) Americans, (b) Chinese, (c) English, (d) French, (e) Germans, (f) Indians, (g) Negroes, (h) Pakistanese, and (i) Russians.

A check list of the same 80 characteristics was prepared for rating on a 3-point scale on the basis of their desirability.

A list of the nine ethnic groups was prepared for ranking on the basis of preference for association with the members of those groups.

### 3. *Procedures*

All the 200 subjects were given the list of 80 characteristics and asked to select from the list those five characteristics which seemed to them to characterize best each of the nine ethnic groups.

The subjects were then given the check list and asked to rate each characteristic on a 3-point scale on the basis of desirability.

Finally, the subjects were given the list of nine ethnic groups and asked to put in rank order the nine ethnic groups on the basis of preference for association.

## D. RESULTS AND DISCUSSION

Table 1 presents the percentage of each of the 10 most frequently assigned characteristics to each ethnic group in rank order both before and during the dispute.

TABLE 1  
TEN MOST FREQUENTLY ASSIGNED CHARACTERISTICS TO THE NINE ETHNIC GROUPS  
BEFORE AND DURING SINO-INDIAN BORDER DISPUTE

Characteristics assigned before the dispute		Characteristics assigned during the dispute	
Rank order	Per cent	Rank order	Per cent
<i>Americans</i>			
Active	51.5	Active	58.5
Materialistic	26.5	Materialistic	27.0
Ambitious	26.0	Ambitious	23.5
Industrious	25.5	Industrious	22.5
Adventurous	19.0	Adventurous	20.0
Scientifically minded	19.0	Scientifically minded	20.0
Cultured	17.0	Cultured	19.0
Diplomat	16.0	Intelligent	18.5
War-monger	16.0	Democratic	17.0
Proud	15.0	Diplomat	16.0
<i>Chinese</i>			
Artistic	47.0	Aggressive	71.5
Religious	31.0	Cheat	60.0
Industrious	24.0	Selfish	43.5
Friendly	19.5	Artistic	32.5
Progressive	17.5	War-monger	21.0
Honest	17.0	Cruel	20.0
Nationalistic	14.5	Shrewd	19.5
Brave	13.0	Industrious	18.0
Cultured	12.5	Stupid	15.0
Active	12.0	Religious	11.0
<i>English</i>			
Adventurous	30.5	Adventurous	39.5
Active	26.5	Active	30.5
Cultured	26.5	Cultured	25.0
Tradition loving	25.0	Tradition loving	24.5
Intelligent	20.5	Intelligent	23.0
Brave	20.0	Brave	20.5
Diplomat	18.5	Diplomat	20.0
Industrious	18.5	Industrious	17.0
Democratic	17.5	Proud	16.0
Proud	15.0	Democratic	15.0
<i>French</i>			
Artistic	26.0	Artistic	29.0
Pleasure loving	24.0	Pleasure loving	26.5
Cultured	19.5	Cultured	18.5
Musical	18.5	Musical	18.5
Passionate	17.0	Passionate	18.0
Impulsive	13.0	Impulsive	15.0
Showy	13.0	Talkative	14.0
Talkative	12.5	Showy	12.5
Nationalistic	12.0	Nationalistic	11.0
Sentimental	10.5	Shrewd	9.5
<i>Germans</i>			
Brave	30.0	Brave	32.5
Scientifically minded	27.5	Scientifically minded	30.5
Intelligent	27.0	Intelligent	26.5
Industrious	25.0	Industrious	25.0
Progressive	16.5	Progressive	21.0



TABLE 1 (continued)

Characteristics assigned before the dispute	Per cent	Characteristics assigned during the dispute	Per cent
Rank order		Rank order	
<i>Germans (continued)</i>			
Ambitious	14.5	Ambitious	20.5
Active	13.5	Aggressive	16.0
Aggressive	12.5	Efficient	15.0
Cultured	12.0	Cultured	14.0
Efficient	11.5		10.0
<i>Indians</i>			
Peace loving	49.5	Peace loving	54.0
Religious	40.0	Religious	41.5
Kind	31.5	Kind	35.0
Philosophical	21.5	Hospitable	31.0
Hospitable	21.0	Democratic	28.5
Democratic	19.0	Friendly	20.0
Friendly	18.5	Idealistic	19.5
Superstitious	17.0	Superstitious	16.5
Idealistic	15.0	Honest	16.0
Easily satisfied	13.5		15.5
<i>Negroes</i>			
Backward	55.5	Backward	50.0
Uncultured	51.5	Uncultured	47.0
Dull	31.0	Dull	30.5
Physically dirty	27.0	Physically dirty	25.5
Unartistic	26.0	Unartistic	22.5
Brave	25.5	Brave	21.5
Cruel	21.5	Cruel	19.0
Easily satisfied	11.5	Stupid	15.5
Stupid	11.5	Easily satisfied	12.0
Faithful	11.0	Faithful	10.0
<i>Pakistaneese</i>			
Cruel	31.0	Cruel	33.0
Selfish	28.0	Selfish	24.5
War-monger	28.0	War-monger	21.0
Greedy	25.5	Greedy	20.0
Religious	25.0	Religious	19.5
Cheat	20.0	Cheat	18.5
Aggressive	19.0	Nationalistic	15.0
Intolerant	18.0	Aggressive	14.5
Stupid	17.5	Stupid	13.0
Proud	16.0	Intolerant	12.0
<i>Russians</i>			
Scientifically minded	44.5	Scientifically minded	50.0
Progressive	38.0	Progressive	46.0
Active	27.5	Active	30.0
Adventurous	22.5	Adventurous	26.5
Industrious	21.5	Industrious	25.5
Ambitious	20.0	Dominative	20.0
Brave	18.0	Brave	18.0
Materialistic	17.0	Practical	15.0
Practical	17.0	Shrewd	14.5
Intelligent	14.0	Intelligent	13.0

An examination of Table 1 shows no change in the 10 most frequently assigned characteristics to the English, Germans, and Negroes during the Sino-Indian border dispute from what they were before the dispute. This shows that the stereotypes in respect of these three ethnic groups remained completely stable. Clearly, here we have an instance of complete persistence of stereotypes.

So far as the French, Indians, and Pakistanese are concerned, there is in each case a change of one characteristic only. The characteristic 'sentimental' previously attributed to the French is replaced by the characteristic 'shrewd'. In the case of Indians, the characteristic 'easily satisfied' is replaced by the characteristic 'honest'. The characteristic 'proud' which was previously assigned to the Pakistanese does not occur during the dispute, and the new characteristic that appears is 'nationalistic'. Obviously, in these three cases also stereotypes have shown remarkable stability.

Out of the 10 most frequently assigned characteristics to the Russians and Americans during the dispute, eight are identical with the characteristics assigned to them before the dispute. The Russians, previously regarded as 'ambitious' and 'materialistic', are now considered 'dominative' and 'shrewd'. Similarly, the Americans, previously looked upon as 'war-monger' and 'proud', are now attributed the characteristics 'intelligent' and 'democratic'. The agreement in regard to these two ethnic groups also indicates considerable stereotype persistence.

The change in the characteristics assigned to the Chinese during the dispute is remarkably great. Out of the 10 most frequently assigned characteristics to them before the dispute, only three appear during the dispute. The Chinese who were looked upon as 'friendly', 'progressive', 'honest', 'nationalistic', 'brave', 'cultured', and 'active' before the dispute are now characterized as 'aggressive', 'cheat', 'selfish', 'war-monger', 'cruel', 'shrewd' and 'stupid'.

It will be evident from the preceding analysis that the stereotypes of the subjects toward eight ethnic groups, namely, Americans, English, French, Germans, Indians, Negroes, Pakistanese, and Russians have almost remained the same. The change has been rather meagre. This obviously shows that the Sino-Indian border dispute has not substantially affected the stereotypes of university students toward these eight ethnic groups. In the case of Chinese, however, the change has been a marked one. This is due to the fact that only India and China are directly involved in the border dispute. Thus group stereotypes are not easily modified. It requires unusual local or world events to modify them.

When the 10 most frequently assigned characteristics to the different ethnic groups mentioned in Table 1 for both before and during the dispute are categorised on the basis of their desirability or otherwise, the picture that emerges is as in Table 2.

TABLE 2  
PERCENTAGES OF DESIRABLE, NEUTRAL, AND UNDESIRABLE CHARACTERISTICS ASSIGNED TO  
THE NINE ETHNIC GROUPS BEFORE AND DURING SINO-INDIAN BORDER DISPUTE

Ethnic groups	Periods	Percentage of		
		Desirable	Neutral	Undesirable
Americans	Before	80	0	20
	During	100	0	0
Chinese	Before	100	0	0
	During	30	0	70
English	Before	80	10	10
	During	80	10	10
French	Before	50	0	50
	During	50	0	50
Germans	Before	90	0	10
	During	90	0	10
Indians	Before	60	10	30
	During	70	10	20
Negroes	Before	20	0	80
	During	20	0	80
Pakistanese	Before	10	0	90
	During	20	0	80
Russians	Before	100	0	0
	During	80	0	20

Table 2 shows that there is no difference in the percentage of desirable, undesirable, or neutral characteristics assigned to English, French, Germans, and Negroes in the two periods. So far as the Americans, Indians, and Pakistanese are concerned, it will be noted that the percentage of desirable characteristics has increased in each case. The increase in the case of the Americans is from 80 to 100, for the Indians from 60 to 70, and for the Pakistanese from 10 to 20. It will be further seen that in the case of the Russians and Chinese, the percentage of desirable characteristics has decreased. The decrease in the case of the Russians is from 100 to 80, and for the Chinese from 100 to 30. The marked decrease in the percentage of desirable characteristics assigned to the Chinese is obviously due to the present tension between India and China.

When the data of Table 2 are tested for significance of difference between the two periods for each of the nine ethnic groups, it is found that the differences are all insignificant excepting, of course, the difference between



the two periods for the Chinese which is significant at .01 level of confidence (3, Table N, p. 551).

The data for ranking on the basis of preference for association for both before and during the dispute are summarized in Table 3.

TABLE 3  
PREFERENTIAL RANKING FOR ASSOCIATION BEFORE AND DURING SINO-INDIAN  
BORDER DISPUTE

Ethnic groups	Average rank before Sino-Indian dispute	Average rank during Sino-Indian dispute
Indians	7.62	7.72
Russians	6.38	6.47
English	6.26	6.51
Americans	6.16	6.81
Chinese	4.65	2.00
Germans	4.63	4.90
French	4.54	4.87
Pakistanese	2.37	3.46
Negroes	2.10	2.29

On an examination of Table 3, it will be evident that there is a marked similarity between the preferential rankings of the nine ethnic groups before and during the dispute. There have actually been three distinct changes. The Americans, previously ranked as No. 4, have now been ranked as No. 2, and the Russians, previously ranked as No. 2, as No. 4. In the case of the Chinese, it is found that the rank has changed from No. 5 to No. 9. The Indians and English have retained their first and third positions respectively. The change in the rank of Germans, French, Pakistanese, and Negroes is only consequential in as much as these ethnic groups have retained their relative orders and have each gone up one step because the Chinese have been placed at the bottom. It is clear then that the subjects have maintained their previous attitudes in respect of six ethnic groups so far as preference for association with them is concerned. In respect of the Russians and Americans, there has been simply an interchange of ranks, i.e., the Americans have gone up and the Russians have come down, by two ranks. The marked change, however, has been in the case of the Chinese who have been placed at the bottom for preference for association.

The data for the preferential ranking for association conform to the findings arrived at by an analysis of the percentages of desirable, undesirable, and neutral characteristics assigned to various ethnic groups. In order to find out the relationship between preference for association and the ranking on the basis of desirability of characteristics assigned to the different ethnic groups, the rank difference coefficient of correlation for both before and

during the dispute was obtained. The rho coefficient obtained for before the dispute was .58, which although not significant at .05 level of confidence is very close to it. The rho coefficient for during the dispute was .73, which is, however, significant beyond .05 level of confidence. These rather low rho coefficients clearly indicate that preference for association is not entirely a function of stereotypes.

#### E. SUMMARY

The purpose of this study was to investigate the change and persistence in the stereotypes of 200 students of Patna University toward Indians and eight other ethnic groups, namely, Americans, Germans, Chinese, English, French, Negroes, Pakistanese, and Russians, in the context of the Sino-Indian border dispute. The findings were as follows:

(a) The preexisting stereotypes toward all ethnic groups, excepting the Chinese, remained almost unchanged. The change in the case of Chinese was a marked one.

(b) There was no significant difference in the percentages of desirable, undesirable, or neutral characteristics assigned to the different ethnic groups before and during the dispute, excepting the Chinese where the difference was found to be significant at .01 level of confidence. The percentage of desirable characteristics assigned to the Chinese came down from 100 before the dispute to 30 during the dispute.

(c) The data for the preferential ranking for association bear striking resemblance to the findings based on the analysis of the percentages of desirable, undesirable, and neutral characteristics assigned to the different ethnic groups. The Chinese were placed at the bottom for preference for association.

(d) It was also evident that preferential ranking for association is not entirely a function of stereotypes.

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## A STUDY OF CULTURAL ORIENTATION OF PAKISTAN CHILDREN THROUGH THEIR USE OF COMMON OBJECTS\*

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### A. PROBLEM

Dennis (1), in a recent paper, made use of a new technique for the study of children's concepts of the uses of common objects; he believes that the technique is universally applicable. He compared the responses of American, Lebanese, and Sudanese children as to the use of universally present objects. He was able to demonstrate that children of different cultures differ in their ideas as early as five years of age. With the use of this technique it seems possible to build up hypotheses regarding the interests, values, and beliefs which are being learned by children in different cultures.

The present study employed Dennis' technique to study the uses of common objects as indicators of cultural orientation in East Pakistani children. There has been very little work done on the pattern of child behaviour in Pakistan. The present study is reported only as the beginning of a new consciousness of socio-cultural research in Pakistan.

### B. METHOD

The method employed was a replication of the question asked by Dennis, i.e., "what is . . . . for?" The list of common objects used as stimulus words also was the same and was used in the same order. The subjects responded orally in Bengali (the local language) and their responses were translated and recorded by the interviewer in English.

Although the questions put to the children did not ask for more than one response, some children gave more and these were also recorded and tabulated.

#### 1. Subjects

In all 88 children ranging between the ages of six and 11 were included in the present sample. Under the circumstances it was not possible to draw a

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very strictly representative sample. All the children belonged to two schools which catered to children mostly from upper middle class parents. The income of the parents averaged Rs.600/- per month which is roughly upper middle class in the socio-economic structure of Pakistan. The data, therefore, of the present study pertain only to the upper middle class children of East Pakistan. It would have been more instructive and scientifically more valid to have a more representative and sizable sample for the study, but it was practically impossible with the limited financial resources of the investigator.

There were 64 male and only 24 female children in the sample, the reason being that female education is not as popular. The average age of the male and female children respectively was 7.84 and 7.54 years. For purposes of comparison the group was divided in terms of age and sex. There were 41 male and 19 female children in the 6-8-year age-range; and 23 male and 5 female children in the 9-11-year age-range. All the subjects came from Muslim homes, Islam being the religion of 80 per cent of the population.

## 2. *Procedure*

For purposes of comparison all the responses have been classified in the same categories as that of Dennis. Answers which could not be so assigned, have been separated and presented in Table 2. Lest the list of such responses be too long, only those above a frequency of 10 responses have been included in Table 1. This was done arbitrarily.

## C. RESULTS

### 1. *Mouth*

According to the subjects, most frequent uses of the mouth are eating and talking. This, compared with Dennis' results, indicates that the present subjects are culturally nearer to Lebanese than to American children. Drinking is a very infrequent response. East Pakistan is a land of rivers and water. This would be in line with Dennis' interpretation of high frequency of drinking responses among Sudanese children.

Besides these three categories, Table 2 gives three more categories of responses which were absent in Dennis' subjects. Also there were three responses of spitting, two for biting, and one each for praying, criticising, respiration, and smoking.

### 2. *Hand*

The present subjects are again nearer to Lebanese and Sudanese children in the order in which they have responded to the categories. Eating is most frequent response. This is because of the cultural custom of eating with the

TABLE 1  
SHOWING THE FREQUENCY OF RESPONSES

Stimulus-words	Male	Female	6-8 yrs.	9-11 yrs.
<i>Mouth</i>				
Eating	60	21	56	25
Talking	44	17	40	21
Drinking	9	1	5	5
<i>Hand</i>				
Eating	44	14	40	18
Writing	34	10	25	19
Working	30	13	35	8
Playing	27	6	16	17
<i>Mother</i>				
Providing food	61	18	48	29
Providing care	62	29	62	29
Nursing	0	0	0	0
<i>Father</i>				
Earning money	59	15	50	24
Buying food	34	14	31	17
Providing care	36	5	6	14
Assisting family	1	0	1	0
<i>Boy</i>				
Going to school	65	24	59	30
Working, helping	8	5	7	6
Future reference	0	0	0	0
Playing	63	20	54	29
<i>Girl</i>				
Going to school	47	16	40	23
Working, helping	33	11	25	19
Future reference	2	0	2	0
Playing	36	11	35	12
<i>Tree</i>				
Food	45	19	36	28
Wood	26	6	18	14
Shade	25	4	17	12
Climbing	0	1	0	1
<i>Wood</i>				
Fire	34	14	33	15
Building	16	5	12	9
Furniture	55	16	47	24
Gates	0	0	0	0
<i>Dogs</i>				
Guarding	53	15	45	23
Bark, bite	65	23	58	30
Hunting	4	0	1	3
Pets, play	9	3	5	7
<i>Cats</i>				
Catching mice	47	7	35	19
Meowing	20	6	13	13
Pets, playing	6	9	13	2



TABLE 1 (*Continued*)

Stimulus-words	Male	Female	6-8 yrs.	9-11 yrs.
<i>Birds</i>				
Eating	5	2	6	1
Flying, singing	86	24	67	43
Enjoying	14	8	15	7
<i>Stones</i>				
Throwing, hitting	16	5	15	6
Building	60	25	59	26
<i>Sun</i>				
Drying	9	2	10	1
Warming	41	9	28	22
Light	65	26	63	28
<i>Sand</i>				
Playing	19	8	24	3
Building	49	14	41	21
<i>Rain</i>				
Growing plants	17	5	10	12
Providing water	83	28	79	32
<i>Gold</i>				
Decorative	62	23	57	28
Economic	5	2	4	3

hands. Holding and catching (Table 2) are also frequent. Play has the lowest frequency of responses. It may be due to the fact that most of the children's plays utilize something else which they catch or hold in the hand. Hence for them it is the object they play with and not the hand which is used for playing.

Besides these, there were nine responses for beating, four for counting and one each for drinking, salute, and rowing.

### 3. *Mother*

For this stimulus the responses are similar to Dennis' in so far as providing food and taking care have the highest frequency. The responses are greater from younger children. Stitching and working is also mentioned by a number of subjects. Beating as a response is given by 16 and only two mentioned reading and story-telling as the function of the mother.

### 4. *Father*

Like the Lebanese father in the Dennis study the East Pakistani father has also a dreary life. He earns money, buys food, and provides care to the family. Besides this, if the responses of the children are to be believed, he

TABLE 2  
SHOWING RESPONSES DIFFERENT FROM DENNIS' CATEGORIES

Stimulus-words	Male	Female	6-8 yrs.	9-11 yrs.
<i>Mouth</i>				
Reading	26	8	21	13
Sing	10	6	10	6
Laugh & Cry	17	9	14	12
<i>Hand</i>				
Hold & Catch	31	9	23	17
<i>Mother</i>				
Stitch & Works	21	3	10	14
Beats	12	4	12	4
<i>Father</i>	0	0	0	0
<i>Boy</i>				
Quarrels	11	0	4	7
<i>Girl</i>				
Sings	18	7	13	12
Dances	20	9	17	12
<i>Tree</i>				
Flowers	13	5	10	8
<i>Wood</i>	0	0	0	0
<i>Dog</i>	0	0	0	0
<i>Cats</i>				
Eats rice & fish	41	15	37	19
<i>Birds</i>				
Lays eggs, makes nest and feeds young	22	10	26	6
<i>Stone</i>				
Set in ring	5	5	7	3
<i>Sun</i>	0	0	0	0
<i>Sand</i>	0	0	0	0
<i>Rain</i>	0	0	0	0
<i>Gold</i>	0	0	0	0

has no other relationship with the family. He is so hard-pressed for earning money and providing assistance to the family that he hardly gets any time for affection and other family ties. The majority of the children emphasized earning as the main function of the father. There were, however, a few responses like eating and rebuking. Some of the children referred to their fathers' profession also.

### 5. *Boy and Girl*

Following Dennis' category of responses the most frequent response both in the case of boy and girl is "going to school." Working and helping was also the response both from the boy and girl. The girls, however, were more in number in the response. In Pakistani culture the girls mostly help the mother in the domestic duties. The boys in early age are left more or less free while the girls are expected to help the mother. This was substantiated by the responses. Forty-four girls and 13 boys gave working and helping as a response to "what is a boy for" and "what is a girl for." In the case of girls there were responses relating to dances and singing too. This relates to the real situation. The girls in most of the homes in preference to boys are trained in singing and dancing. This is supposed to be a good marriage qualification for the girl. This, of course is more true in the case of Hindu girls, but this is in fact the general pattern of culture. Playing was a more frequent answer from boys than from girls. This also relates to the above statement that the boys are left relatively free at their early age while the girls are engaged in the house-hold duties.

### 6. *Tree*

Food is the most frequent response from both the males and females. The younger subjects gave more responses of food than the older ones. Next in order is wood which is a bit different from the response which Dennis got from all his subjects. Climbing is almost missing as a response. Shade is almost as frequent as wood. Both wood and shade are more frequent in boys than in girls. This is understandable because the girls, right from the early age are not allowed to go out very much. They are mostly confined within the home or very near to the home compound. East Pakistan is a country of rivers and abounds in food-bearing trees and the responses of food are, therefore, understandable.

### 7. *Wood*

The most frequent response to wood is furniture. The frequency is higher for younger children. It seems that the first objects made of wood that they have seen in their homes are furniture. The next in order is fire. In most of the homes in East Pakistan they use wood as fuel for cooking. Kerosene oil or electric ovens are not even known to most of the people. Building as the response to "what is wood for," is not very frequent. Most of the houses in East Pakistan are made of bamboo. Except in cities we do not make much use of wood in building. The door in most of the bamboo houses is also



made of bamboo. Hence gate also is not a response mentioned by any children. In this case the East Pakistani children are like the American and Lebanese children (1).

### 8. *Cats and Dogs*

In East Pakistan like other parts of Near East and Far East, there are not domesticated pets as there are in Europe and America. They are treated very much like other domestic animals. The answers, therefore, reflect this practice. The highest frequency is given to barking and biting in case of dogs; and catching of mice, in case of cats. In East Pakistan, in most of the middle and lower middle class families dogs are not kept at all inside the house and guarding as a function of dogs is almost unknown in the lower middle class houses. This may also be due to the fact that we are a poor country and cannot afford to feed our pets. It is only in upper middle class houses that dogs and cats are sometimes kept as pets. Guarding was the second more frequent response for dogs. Hunting with dogs is almost unknown in East Pakistan. The country is full of rivers and therefore, fishing is most popular. There are only few big jungles and very few go for hunting there. Hunting, therefore, was the least frequent response for dogs. The most frequent response for cat is catching mice. This is what most of the children see both in their houses and outside. There were, however, one or two responses regarding the behaviour of the cat with its young. Bright "eye" "living in dark" "bearing pussy" were also some of the responses.

### 9. *Birds*

For most of the children the frequent functions of birds are to fly and to sing. Almost 90 per cent of the children gave this response. Eating was mentioned only by seven children. In East Pakistan, chicken are the only birds that are eaten most frequently but our children did not take chicken as a bird. The bird is one that flies and can not be domesticated and therefore the infrequent response does not refer to chicken at all. It only refers to other small birds which are in most cases not eaten and any way it is difficult to catch them. Enjoying was another response given by a few children.

### 10. *Stones*

The most frequent response to stones is building. Another response is throwing and hitting. Building as a response was given mostly by the male children of the younger age. It appears from the responses that here it refers primarily to building a house for play. The children do make buildings

with stones when they are playing. There was one response as statue, and one response as "sharpen the knife." But these appear to be some of the individual uses to which stone has been put by some of the boys.

### 11. *Sun*

Most expectedly the most frequent response was light and this is the predominant function of sun in this part of the world. Warmth is the second most frequent response. And the third response is drying which is again a very important service provided by the sun. There were a couple of responses regarding the sun's usefulness to crops.

### 12. *Sand*

Building is the most frequent response. It appears that most of the children mix it up with mud which is very frequently used in building houses in the villages. Sand is also used by the boys for building little houses in their games. Building as a response is mostly given by male children of younger age. Building is the second response by only 30 per cent of the boys.

### 13. *Rain*

Providing water is more frequent than growing plants. This is just the opposite of what Dennis got from his subjects. The difference can be explained in so far as the area from which Dennis' subjects come (Sudanese specially) is mostly desert and the most important function of rain will naturally be to help in agriculture. In East Pakistan water is not a problem in agriculture. The most frequent response of "providing water" is understandable because rain is one of the most important sources of drinking water. Hence 90 per cent of the children gave this as the most frequent response to rain.

### 14. *Gold*

Almost all the responses to gold referred to its decorating functions. There were only seven responses referring to the economic aspects of gold. In this respect our subjects are very much like the Sudanese children and just the opposite of the American children. This is a very clear indication of the cultural similarity of Sudan and dissimilarity of America with East Pakistan. Gold in East Pakistan is mostly used for making ornaments. Very few people care for its economic value. It is, however, surprising that the responses are more frequent in the male children than in the female ones. It may, however, be that the responsibility of providing gold ornaments rests on the males.

## D. GENERAL CONCLUSIONS

The data, however meagre and unrepresentative, seem to corroborate Dennis' hypotheses. The uses of common objects do indicate the general cultural pattern of a group. The present data also indicate certain similarities of the present subjects with Sudanese and other Arab children and certain dissimilarities with the American children. It might be suggested in conclusion that the present technique is useful and valuable in the cross-cultural study of children.

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## INSTRUMENTATION IN SOVIET PSYCHOLOGICAL RESEARCH: A CONTRIBUTION TO THE METHODOLOGY OF TOURISM\*

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### A. INTRODUCTION

With the present dearth of published research in English on Soviet psychology and the fewness of those with the language competence and experience necessary for direct inspection of psychological material in the original Russian, it is not surprising, in view of the great interest of Americans in Soviet science since sputnik, to find the visitor to Soviet institutions of psychology regarded, on his return, as somehow endowed with special knowledge and insight. However modestly he may demur, the returned visitor cannot help but speak with the authority of one who was there and be so regarded by others. In consequence, the tourist in the Soviet psychological domain finds himself slipping into the inadvertent role of substitute for the scholar with results that sometimes are very much on the unfortunate side.

Nevertheless, on-the-spot viewing and chatting undeniably serve a purpose and a very useful one. Since a trip to the Soviet Union is now the vogue and promises to continue indefinitely so, it is urgent—if we wish to spare ourselves the consequences of a naive tourism—that ways be found to maximize the potentialities of this method of getting to know about Soviet psychology and to minimize its pitfalls. The writer proposes, accordingly, a simple solution—instead of the mutual opposition of scholarship and tourism, let the former assist the latter in what can be, as presently practiced, only an impressionistic and superficially fact-finding enterprise. And he proposes to demonstrate the utility of this solution by documenting a representative case: instrumentation in Soviet psychological research as we here in the West define the latter activity.

Several Soviet publications (mainly from 1956 to mid-1959)<sup>1</sup> were

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<sup>1</sup> *Herald of the USSR Academy of Medical Sciences (Vestn. Akad. Medits. Nauk SSSR)*: 1956-59; *Herald of Ophthalmology (Vestn. Oftal.)*: 1956-59; *Journal of Higher Nervous Activity (Zh. vyssh. nervn. Deiatel.)*: 1956-59; *Medical Worker*

culled for material that would bear on instrumentation in psychological research. Since very many of the research problems in biophysics, physiology, medicine, ophthalmology, etc., as the latter are understood in the Soviet Union, would be bracketed in the West as definitely within psychology or some hyphenated aspect of it, this meant consultation of both psychological and nonpsychological journals—particularly the latter, since there is only one journal of psychology as such in the Soviet Union.<sup>2</sup> All direct references to instrumentation within these disciplines, indicative of general or local conditions therein, that were noted were recorded and are reproduced below. Reproduction is made without comment and in alphabetical order by author.

### B. DIRECT QUOTATIONS

At present the technical equipment of medical institutions leaves much to be desired. Complex diagnostic and therapeutic apparatus are in short supply, and medical equipment as well. Much apparatus is obsolete and does not meet contemporary needs. For the most part equipment is not standard, and there is not enough of it. It is necessary to review the list of manufactured medical articles and to modernize some and to replace others.

An important goal is modernization of existing diagnostic apparatus and the creation of new ones for the objective study of the state of the circulatory and respiratory organs. The study of higher nervous activity and biopotentials of the brain require up-to-date encephalographs . . . Apparatus for registration of the biocurrents of the heart, nerves, and muscles are likewise necessary . . .

As regards laboratory equipment and special apparatus, here we have really something to get busy over. It is necessary [to manufacture] up-to-date high frequency centrifuges, apparatus for electrophoresis, electron microscopes with photocinematic accessories, electromicrotomes, . . . (Anan'ev, 1959).

The improvement of the quality of surgical instruments . . . and specialized devices is of very great importance . . . The medical industry continues to turn out more than a 1,000 different kinds of instruments and apparatus without their essential modernization and modification in the course of production . . . As a result, many instruments put out at the present are functionally obsolete and do not

(*Medits. Rab.*): 1958-59; *Problems of Psychology* (*Vop. Psikh.*): 1955-59; *Problems of Physiological Optics* (*Probl. fiziol. Optiki*): 1955-58; *Teachers' Newspaper* (*Uch. Gaz.*): 1956.

<sup>2</sup> This journal is *Problems of Psychology* (*Vop. Psikh.*), founded in 1955. Were it not for major emphasis on pedagogically oriented research, the journal *Reports of the Russian Republic Academy of Pedagogical Sciences* (*Dokl. Akad. pedagog. Nauk RSFSR*), founded in 1957, could also be mentioned. Even *Problems of Psychology* carries increasingly articles devoted to presentation of pedagogically oriented research.

correspond to the requirements of surgery and even to the level of present technical development . . . (Anan'ev & Gritsman, 1956, p. 83).

It is difficult to procure equipment for places specializing in therapeutic physical culture and anthropometry. Such simple and inexpensive pieces of apparatus as spirometers are not to be had . . . being rarely for sale. Tonometers quickly get out of order, and workshops refuse to undertake their repair. Even stopwatches have to undergo frequent repair (Antimonova, 1958).

The following have a negative effect on the quality of student performance in psychology: overloading with assignments, the complete absence of laboratory equipment in psychological premises, insufficient departmental attention to student performance, and the weak general training of the student body (Arzhanova, 1957, p. 189).

Finally, it is time to think about the technical equipment of our physiological institutes and laboratories. In this field we clearly lag behind. It is necessary in every way to look after the development of the ideas on the construction of new apparatus and the adoption of the latest technique in physiological laboratories. To this end there ought to be set up a large experimental plant for apparatus-construction (to be associated with the USSR Academy of Sciences or another scientific center). But, not anticipating this, it is [at least] necessary to arrange for the serial production of a good many pieces of contemporary apparatus [that is, their mass-production]: bioelectric amplifiers, micromanipulators, microforges, and the like. The adoption of the latest technique presupposes improvement in the equipment of the institute workshops.

Capable young scientists should be systematically directed to the best foreign laboratories to master the latest methods (Asratian, 1959).

While remarking that Ukrainian psychologists had managed a certain progress in their research, G. S. Kostiuk made a special point to speak of existing defects related to planning of research, research methods and instrumentation, analysis of experimental material, and demonstrability of results claimed (Baev, 1958, p. 181).

Many also spoke of the little attention paid to the development of general psychology and psychological theory [in the Soviet Union]. Such development was struck a great blow by the liquidation of departments of psychology in a considerable proportion of our universities and pedagogical institutes. Much was spoken of the limited means for the publication of completed research and also of the limited means for the design and manufacture of apparatus for psychological research (Baev, 1958, p. 186).

It is necessary to equip our medical research institutions with the latest in scientific technique, which our own industry is in the process of creating. The experience of the joint collaboration of the USSR Academy of Medical Sciences and the former Ministry of Machine Construction and Instrument Construction in the building of new medical



apparatus has been already crowned with a certain success, thanks to which our medical research and therapeutic institutions have received a number of new original apparatus and equipment for their work. It is necessary to emphasize, however, that we still lag behind in the application of the latest technique (Bakulev, 1956, pp. 7-8).

One of the chief reasons for the backwardness of our science is the inadequacy of its technical equipment. For this reason the efforts of the Academy of Medical Sciences were directed toward raising the technical level of our scientific-research institutions . . . [However], many complaints can [still] be made about the quality of our manufactured surgical instruments (Bakulev, 1957a, p. 6).

. . . In a number of areas, unfortunately, Soviet medical science lags behind its foreign counterpart.

One of the chief reasons for the resulting backwardness lies in the inadequate technical equipment to be found in our scientific-research institutions. Within the last few years considerable attention was directed toward rectifying this state of affairs. Through purchase of various instruments and apparatus from abroad and the manufacture of certain apparatus here at home, the central institutes—in particular, those of the USSR Academy of Medical Sciences—strengthened their technical base. But this is not enough. Our own industry does not manufacture, for example, microtomes for ultrafine sections, low temperature centrifuges, and other contemporary apparatus.

There has been recently [some improvement in this direction, but] . . . unfortunately, the division of the [previously combined] Ministry of Machine Construction and Instrument Construction into two separate ministries has had a pronounced delaying effect, and the USSR Ministry of Public Health has not been able to get its orders filled for apparatus which are already designed, but which, because they cannot be serially manufactured [that is, mass-produced], are not being turned out. Because of this, our scientific and medical institutions are unable to procure extremely important and necessary apparatus.

It is also necessary to point out that scientific workers in the research institutes demonstrate very little familiarity with the latest apparatus. In several institutes one can observe expensive apparatus, imported from abroad, which are not utilized over a period of years merely because researchers do not know how to handle the equipment. A tour of verification on the utilization of new apparatus, carried out by the USSR Ministry of Public Health and the USSR Academy of Medical Sciences, revealed that in a number of institutes . . . there is a great deal of unutilized apparatus. It will be necessary to take measures to raise the level of technical skill and understanding among the researchers and technical personnel of the institutes.

Much apparatus and many surgical instruments are of extremely low quality. It is absolutely intolerable that we do not have good syringes and needles, good scalpels, etc., not to mention more complex instruments

and devices. And yet magnificent surgical instruments, which often win prizes in international exhibitions, are produced in our country.

We do not yet have the means to get apparatus and instruments repaired in good time. Much has been said about setting up repair shops, but these have not been organized to this day. Meanwhile, it is well known that in almost every institute abroad there exists a small repair shop which undertakes to make all small repairs and even constructs new instruments and apparatus of simple design. It is necessary to set up such repair shops in every large institute so that they may also service other scientific-research and medical institutions . . .

It is necessary especially to point out that in the last few years scientific research in the departments of higher educational institutions has sharply slackened, although a considerable number of qualified scientific personnel is to be found concentrated there. For example, in 200 scientific-research institutes 700 doctors of science are employed, but in 87 higher institutions of learning and institutes for advanced training, more than 1,700. But this great scientific force does not participate in research on basic problems. In fact, many departments in institutions of higher learning, by virtue of teaching loads that are too great, poor equipment, and the lack of assisting personnel, are not associated with science and are engaged only in teaching. It is necessary to work toward the reduction of the teaching load in these departments, an increase in the number of assisting personnel, and an increase in funds allotted for equipment and scientific-research work (Bakulev, 1957b, pp. 5-8).

The Communist Party and the Soviet government give daily attendance to science and scientists. Great sums are allotted annually for the support of scientific-research institutions. New buildings are being erected for institutes and laboratories; they are stocked with up-to-date apparatus and equipment and the latest technical devices . . .

Soviet scientists are well equipped to carry on scientific research. The wide adoption of electronics in experimental and clinical medicine has produced a real revolution in medical science (Bakulev, 1959).

However, to this day [production of] such [advanced] apparatus either has not been mastered by us or is limited to single copies which are put on display at exhibitions and actually remain there (Braunshtein, 1956).

In the last few years very little has been done with a view toward equipping our scientific institutions with appropriate apparatus. Meanwhile, however, there are several useful, highly effective and expensive apparatus [to be seen, but they] are [available] almost in single copies only. Yet the daily work of clinical and physiological practice demands an abundance of such apparatus. In due course the Presidium of the USSR Academy of Medical Sciences [even] abandoned our experimental factory—[an action] which caused great harm to our institutes (Chernigovskii, 1956).

Our institutes are still in need of several forms of the latest equip-

ment, domestic and imported. Even to the present time the situation remains bad with respect to reagents for biochemical and pathomorphological investigations and other experimental and therapeutic purposes. Our institutes are experiencing an acute need for staining and contrasting agents, chemically pure amino-acids, and certain therapeutic preparations. Financial allotments for therapeutically needed drugs and for food are insufficient. There are insufficient supplies of linen and dishware . . . (Egorov & Novikov, 1959, pp. 75-76).

Funds, annually allotted to the institutes, for scientific equipment are usually split up among the [various] departments. This makes the acquisition of contemporary scientific apparatus difficult. In Vinnitsk Institute, for example, there is not one photometer, spectrophotometer, multichannel oscillograph, electron microscope, and so forth.

In this way, not having either the necessary apparatus or sufficient time and, in addition, working alone, the teacher in the institute is deprived of the chance to solve [those] serious [research] problems which demand laborious investigations (Gabovich, 1959).

For successful fulfillment of the five-year plan it is necessary to devote as much attention as possible to equipment, to keep an eye on the staff with a view toward supervision over the utilization of new technique . . .

Several words now about equipment. Our institutes are without the means to repair apparatus. Existing workshops do not provide for our needs, and charges for repairs are very high. It is necessary also to point out that the situation with respect to supplying institutes with experimental animals has somewhat improved, but these animals are still supplied at a high cost (Garmasheva, 1956).

The chief suppliers of complex medical apparatus for research purposes is our Ministry of Apparatus Construction and Automatic Means and also a number of other ministries. The Ministry makes wide use of purchases from abroad to acquire models of medical apparatus and devices (Grashchenkov, 1956).

Many [graduate students working on their dissertations], especially those in the provinces [outside the major big cities], frequently experience considerable difficulties. It is no secret that departments in a number of scientific institutions do not possess the equipment necessary for research.

In the Kuibyshev Medical Institute, for example, in the department of normal physiology, work on the physiology of respiration has been pursued for almost 20 years. In this work we have been forced to use apparatus for artificial respiration of "grandfather vintage," which, moreover, is under repair most of the time. For more than 5 years we had been expecting our order for a six-channel oscillograph to be filled. Finally, the apparatus was sent to us, but it was a four-channel one. However, even this we have been unable to utilize for a half year now, since there is no electronics-technician in our department who can set it



up and adjust it. Difficulties such as these are not infrequent (Ivanov, 1959).

The problem of technically equipping electrophysiological laboratories and of training qualified specialists in this field is an acute one. To this day, we do not possess technically precise and reliably functioning multichannel electroencephalographs and polygraphs of domestic manufacture. The eight-channel oscillograph MPO-2, widely distributed in our physiological laboratories, has substantial defects (narrow recording [of amplitude] on film, small quantity of film in the cassette, noise during operation, and other defects). Our industry does not produce at all amplifiers for biopotentials, frequency analyzers, multichannel cathode-ray oscillographs for physiological laboratories, photophonostimulators, apparatus and devices for work with microelectrodes, and other important apparatus. Furthermore, matters are not going at all well as regards the construction and issue of promising unique apparatus like the Anan'ev-Livanov electroencephaloscope.

The Presidium of the USSR Academy of Sciences had adopted a decree on the organization of special construction bureaus and laboratory workshops for the production of such kinds of apparatus. However, physiological institutions have been, to this time, forced to be satisfied with their own rudimentary workshops which cannot be expected to design and construct apparatus requiring factory resources. Nevertheless, there are means for a quick resolution of these problems. Thus, in Leningrad, for example, there has existed for several years a construction agency, "The Biophysical Apparatus Bureau." However, access to this bureau is barred to physiological and clinical laboratories by a number of departmental barriers—"The Biophysical Apparatus Bureau" is in the Leningrad economic district and is under the jurisdiction of the Ministry of Public Health. [One must note] in this connection [that] it is without an industrial base, as the ministry does not command appropriate factories in Leningrad. By doing away with departmental restrictions and by securing the association of "The Biophysical Apparatus Bureau" with physiological and medical institutions in Leningrad and appropriate factories there, things could be got moving forward quickly.

The problem of training technically competent corps of physiologists demands the speediest resolution. Unfortunately, at the present, neither in medical institutes nor in universities are the new methods and [advanced] technical levels of contemporary physiological and clinical research being considered with sufficient seriousness (Kratin, 1958).

Our institutes are very weakly furnished with special apparatus and equipment; many of them do not have an experimental and clinical base and, therefore, are deprived of the means to carry out deep scientific studies (Kuleshov & Lebedev, 1959).

In bringing the conference to a close, IU. A. Samarin . . . emphasized the importance of practical questions, confronting psychologists, and

indicated the necessity of increasing and improving the technical equipment [utilized] in research (Lomov, 1958, p. 186).

In 1955, 26 experimental models of new apparatus and devices for scientific-research and therapeutic institutions of the USSR Ministry of Public Health were developed and built. The greater part of them were approved for mass production; the remainder were marked for developmental testing (Manuilov & Lotts, 1956, p. 84).

The educational-material base in pedagogical institutes is weak and its rectification is going badly. For this reason the work of the experimental departments suffers severely. Frequently a graduate student loses 2 to 3 months on construction of one or another piece of apparatus or equipment. There are insufficient chemical preparations; planks and plywood are lacking and much else. There is not enough [laboratory] housing (Matveeva, 1956).

Our institutes are entirely inadequately equipped with radiation monitoring and radiometric devices (Minasov, 1956, p. 79).

It has to be noted that recently the material-technical furnishing of our institutes has improved somewhat . . . But clinical institutes remain until now badly provided with linen; table and kitchen ware are insufficient; there is little furniture; many institutions of the USSR Academy of Medical Sciences in 1955 were extremely hampered in their quest for new equipment . . . (Minasov, 1956, p. 83).

By virtue of insufficiency of scientific-technical equipment and insufficiency of trained cadres, research in the divisions of science contiguous upon medicine is weakly developed (Nesterov, 1956, p. 18).

. . . the scientific-research institutes in the system of public health have extremely few physicists and technical specialists—[a situation] which denies them the possibility of constructing scientific apparatus at the contemporary technical level (Obrosof & Liventsev, 1959).

In the organization of scientific-research work it is necessary to devote most serious attention to apparatus and reagents and also to the building of quarters for research institutions and higher institutions of learning. To this day we have not got the production of laboratory furniture going. It is necessary to bring into being a special industry which would turn out apparatus, reagents, and special laboratory furniture. The provisioning of laboratories with glass and chemical vessels is no less important. Here we are seriously backward. It is necessary to set up in various cities special workshops (mechanical and glass-blowing) which should be located in every institute (Parshin, 1956).

[The Nov. 1956 meeting in Leningrad of] the XVII Conference on Problems of Higher Nervous Activity proceeded on a high level, in an atmosphere of creative and to-the-point criticism. Along with this, it was observed in the conference that [in the Soviet Union] few physiological studies are being carried out in collaboration with morphologists and biochemists and that contemporary apparatus is insufficiently utilized in physiological research . . . (Pavlov & Vediaev, 1957, p. 324).

. . . with better technical equipment . . . in the ophthalmological research institutions the USSR will be able not only to reach, but also to surpass the achievements of foreign ophthalmology (Preobrazhenskii & Roslavtsev, 1959, p. 59).

The development of new types of devices and apparatus occupies a most important place in physiological optics . . . The administration of the All-Union Ophthalmological Society has frequently brought to the attention of the USSR Ministry of Public Health the matter of large-scale manufacture of existing contemporary apparatus and the creation of new kinds, developed on our own. In accordance with this plan, the majority of contemporary apparatus and instruments was adapted to serial production and mass-produced.

Along with this, there was developed and produced a number of original pieces of apparatus . . . , a considerable proportion of which served to enrich Soviet ophthalmological science and clinical practice.

However, the administration of the All-Union Society, as it methodically considered matters concerning the development of ophthalmological apparatus manufacture, encountered many obstacles in its way. Thus, in 1955 the chairman of the All-Union Ophthalmological Society, Prof. A. S. Savvaitov, in accordance with the decisions of the presidium, brought to the attention of the USSR Ministry of Public Health the matter of inclusion, on a high priority basis, of a number of important pieces of apparatus in the production plan for serial manufacture.

At the same time, with a view toward ensuring the expansion of production of high quality devices and apparatus, the presidium of the administration of the All-Union Ophthalmological Society brought to the attention of the USSR Ministry of Public Health the matter of assignment of a special plant for the manufacture of necessary ophthalmological apparatus.

Unfortunately, not all the matters, advanced by the administration of the society, found favorable resolution. Thus, to the communication of Prof. A. S. Savvaitov, mentioned above, . . . A. Igoshin of the Main Administration of the Medical Instruments Industry replied that the apparatus, suggested by the society, would not be included in the 1956 production plan for serial manufacture, since they, so it seems, are already being manufactured or could be manufactured in the future by enterprises associated with other ministries.

In reality, most of the suggested equipment is not even being considered for manufacture in the planning of these enterprises. The requests of the society are in this manner being bypassed without any real reason whatsoever. Naturally, such organizational defects and, more importantly, the underestimation of [the importance of] the requests, advanced by the administration of the society, delay the proper development of ophthalmological apparatus construction (Rabkin, 1957, p. 13).

Diathermic equipment, quartz lamps, etc. . . broke down. After going all over Khar'kov, we were nowhere able to find a shop where it would



be possible to repair this equipment. Finally, we were able to get it done by means of a private arrangement . . .

However, after spending a great deal of money for cartage and repair, we did not get to use the repaired equipment for long. After one to three days they all went out of commission. The apparatus for diathermy was in the repair shop for 3 months, as the necessary replacement parts were not to be had.

Why hasn't a special workshop, where it should be possible to repair medical equipment, been set up in Khar'kov to this day . . . (Rozenberg, 1958)?

It is also necessary to point to the weakness of technique in experimental studies. Psychological laboratories, even where they exist (and there are exceedingly few of them), are fitted out with equipment not in correspondence with the high level of contemporary technique. Sound recording, filming, and other objective indices of speech and motor reactions in children, [for example], are very little applied in experimental studies (Samarin, 1956).

It seems first of all necessary to emphasize the importance of the laboratory experiment in the teaching of psychology, inasmuch as the application of this method . . . is at present obviously underrated. Experimental-psychological laboratories in higher pedagogical institutions are a comparatively rare phenomenon, but where they should happen to be, their experimental equipment is not at the level of contemporary technical development and contemporary psychological science. Such a state of affairs can hardly be considered permissible (Samuil'kov, 1955, p. 113).

A second matter that has long clamored for attention refers to the provision of technical services for scientific research. Departmental equipment is, on the whole, satisfactory. But complex contemporary equipment requires adjustment and qualified routine checks and repairs by engineering specialists, and the latter are not to be found in our higher educational institutions. As a matter of fact, there are only one electronics technician and one expert in fine mechanics for the more than 300 research workers in Sverdlovsk Institute. The former, moreover, work under the most primitive conditions. Yet, a laboratory workshop, a staff engineer (a specialist on contemporary apparatus), and a number of technicians are an essential necessity for every higher educational institution (Sangailo, 1959).

Planning of scientific research cannot be viewed in isolation from those conditions which bear on the effectiveness of its fulfillment. It seems to me that we can speak of real planning only when we shall receive the equipment and apparatus for realization of what is planned. The question of equipment is one of the most acute (Serebrov, 1956, p. 24).

In the allocation of funds [for equipment, etc.] to the sciences [under the aegis] of the USSR Academy of Medical Sciences, there are a great many things that are wrong. It is imperative that this important matter

be assigned to specialists who are close to science, and not to the book-keepers of the USSR Academy of Medical Sciences and the planning-financial division (Serebrov, 1956, p. 25).

We did not have the means to deal with the solution of a number of problems in experimental psychology. Our research was limited by insufficiency of necessary apparatus, housing, etc. (Sergievskii & Kadochkin, 1956, p. 191).

The Presidium of the USSR Academy of Medical Sciences considers that it is impossible to view as satisfactory the material-technical furnishing of our institutes and the conditions under which work there is pursued. Some institutes of the USSR Academy of Medical Sciences are set up in quarters [so cramped as to be] little suitable for scientific-research work (Timakov, 1956).

In the last few years laboratories have been established in almost every one of the physiological institutions . . . Frequently research problems are undertaken which are unconnected with the major problems of the institutes, between which there is, moreover, little communication. Thus, research forces, equipment, and funds are scattered and dissipated (Voronin, 1959).

On Oct. 5 [1956] the Vice-President of the USSR Academy of Medical Sciences, V. N. Chernigovskii, read a paper on the state, utilization, and prospects of equipment in the institutes of the Academy—[equipment reflecting] the latest scientific technology. In the decree of the Presidium of the USSR Academy of Medical Sciences it was noted that at the present time the institutes of the Academy have been considerably enriched with a number of contemporary apparatus. Several institutes have [also] received a number of imported pieces of scientific apparatus.

Thanks to the great work, performed by the institutes of the Academy together with the Construction Bureau of the Ministry of Machine Construction and Instrument Construction and the Scientific-Technical Council, there exist [now] conditions for the creation of a number of new pieces of apparatus. Along with this the Presidium pointed to a series of serious deficiencies in the matter of furnishing the institutes of the Academy with apparatus and equipment: equipment that was imported is little utilized; in a majority of institutes there are no qualified technical workers, capable of guaranteeing the utilization and repair of apparatus; checking on the use and operation of expensive technical equipment on the part of the Scientific-Technical Council of the Presidium of the USSR Academy of Medical Sciences is insufficiently organized. In the organizational set up of the Presidium of the Academy there is lacking a technical group for checking on the course of construction of apparatus and their approval.

The Presidium noted that the institutes of the USSR Academy of Medical Sciences are experiencing an acute need for apparatus and equipment which have mass use (ultra-centrifuges, special refrigerators,

photokymographs, stimulators, timing devices, and much else) and also for chemically pure reagents . . . (Anon., 1956, p. 81).

Great and systematic reorganization is necessary to bring about an improvement in research. One has to remark bluntly that by far not everywhere are conditions created for intensive and fruitful scientific activity by workers in higher educational institutions. The material-technical base of our medical institutes is being strengthened only slowly and very intermittently; financial support for scientific research is extremely meager. And if up-to-date equipment, laboratory workshops, and the latest apparatus are absent, it is difficult to expect noticeable progress in the solution of the great scientific problems of the present era (Anon., 1957).

. . . the general volume of research [in physiological optics] . . . and in some cases, also, its quality are not up to contemporary demands . . . The construction of apparatus, in particular, lags . . .

. . . the conference considers it necessary to review and decisively to advance research technique on the visual organ both in the clinic and in the experimental laboratory . . . and to encourage the application of modern technical advances in the field of visual correction.

The conference confirms that the production of eye glasses and rims as well as special apparatus for visual correction is not at the requisite level from the qualitative point of view and, from the quantitative standpoint, is insufficient to meet the needs of the populace.

Thus, astigmatic eye glasses are turned out in entirely insufficient quantity; bifocal glasses, put out by industry, are qualitatively inferior, . . . telescopic glasses for the weak-visioned, aniseikonic lenses, etc., are not issued at all.

Telescopic eye glasses, turned out by industry, are applied in a very limited number of cases, as a consequence of the absence of a selection of telescopic eye glasses, the absence of properly equipped offices for their prescription, and the absence of medical oculists, familiar with the technical selection of telescopic eye glasses . . .

. . . the conference recommends that the attention of the USSR Ministry of Public Health be directed to the slow way in which industry is going about the manufacture of already developed apparatus and to the worth-whileness of converting one of the factories within its jurisdiction to the production of ophthalmological apparatus (Anon., 1958).

Compared with the last year, more protective devices of various kinds were received, the replacement of old X-ray apparatus by new safe apparatus is proceeding [more rapidly], more attention is being paid to the repair of equipment and apparatus. In a number of places under the jurisdiction of the Ministries of Public Health of the autonomous republics and of provincial and district departments of health, repair and assembly workshops have been set up (Anon., 1959a).

A scientific-research psychological laboratory was established at the Erevan Pedagogical Institute by decision of the Council of Ministers of



Soviet Armenia in Oct., 1957. However, [in spite of good progress by this first (?) psychological laboratory in Soviet Armenia], there still remain many unresolved problems; great difficulties are being encountered in the acquirement of necessary psychological apparatus; and no success has been registered, to date, in procuring foreign psychological literature although a great need is felt in this (Anon., 1959b).

### C. DISCUSSION

To the sputnik-conditioned reader who has come to expect reports of marvelous doings in all areas of Soviet science (genetics probably excepted), the above material, systematically extracted from Soviet publications, must come as a surprise. It is, in the main, negative in effect. Yet, it is not the intention of the writer to suggest that this material necessarily reveals the "true" story as regards instrumentation in Soviet psychological research, but rather to suggest to the touring psychologist (a) the need for alertness to a more complicated and differentiated picture than what we seem to be getting and (b) what questions to ask and what to look for in order to get at precisely that picture.

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## ATTITUDE TOWARD MAN-INTO-SPACE: DEVELOPMENT AND VALIDATION OF AN ATTITUDE SCALE\*

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### A. PROBLEM

Michael (5) has suggested that the current Man-Into-Space (MIS) program offers an unique opportunity for psychologists to study the impact of a technological change upon the attitudes of the public. Such a program of attitude research requires the development of a measuring instrument, or a series of such instruments, to record possible changes in attitudes as the technological change accelerates. The development of measuring instruments instead of a single instrument is necessary since the effect of the change probably is reflected in a constellation of attitudes rather than in any one attitude dimension.

Two hypotheses have been voiced concerning the genesis of favorable attitudes toward the MIS program. People who are enthusiastic about the development of manned interplanetary flight may be suffering from neurotic tendencies and a high degree of anxiety and are using the MIS program as a psychological means of escaping the real world into the fantasy world of science fiction. Or a favorable MIS attitude may be a specific expression of a more general social attitude that is reflected in a liking for social change, societal experimentation, and the adventuresome opening of new frontiers. Perhaps both hypotheses are correct and favorable attitudes toward Man-Into-Space are attributable to both of these more basic behavior tendencies.

The present paper concerns the development and validation of an MIS attitude scale and a preliminary test of the alternative hypotheses about correlates of favorable MIS attitude.

### B. PROCEDURE

#### 1. Scales

Twenty-five five-alternative multiple-choice items were constructed to measure information related to the current MIS program. Thirteen items asked for information concerning the present guided missile program (names of missiles and men), four items concerned general information and the

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vocabulary of rockets and rocketry, while eight items asked information questions about the solar system, the planets, etc. Typical questions (omitting the five alternative answers) were: which missile is a winged, pilotless airplane with a 5000-mile range; what was the first country to successfully use rockets in warfare; which planet is nearest our sun. Most of the items were informally pretested on seven students to identify ambiguities in item wording and subsequently revised before being included in the scale. Since most of the items appeared to be extremely difficult for students, four extremely easy items were included to provide some reinforcement for the *Ss* taking the scale with these items spaced throughout the scale.

The MIS attitude scale consisted of 30 statements of opinion regarding the space research program deliberately designed to sample a wide range of possible attitudes. Half of the items were worded positively, i.e., agreement with the statement represents a favorable attitude toward MIS, and the remaining 15 statements were worded negatively. Three of the statements were: I hope my children will have a chance to be on the first flight to Mars; all of the rocks on the Moon are not worth the sacrifice of one boy's life; unemployment is a much more serious problem for our country than is building spaceships. Each item was scored trichotomously since the directions requested the *S* to indicate whether he agreed with the statement, disagreed with the statement, or couldn't decide for or against the statement. Agreement with positively worded items and disagreement with negatively worded statements were scored as reflecting a favorable attitude toward the MIS program.

The items on both scales were mimeographed, along with instructions in a single booklet with the information items being presented first as a "Current Affairs Inventory" and the attitude items following as a "Public Opinion Questionnaire."

## 2. Subjects

To determine the normative characteristics of the information and attitude scales they were administered to 234 undergraduate students enrolled in six sections of introductory and applied psychology courses. For purposes of the later statistical analyses the answer sheets were divided into four groups. Groups *A*, *B*, and *D* contained varying numbers of men students ( $Ns = 100, 60$ , and  $34$ ), while Group *C* included 40 women *Ss*. A plurality of the *Ss* were sophomores and varied greatly in their major departments and schools. Approximately one-third were pre-education students, another third were majoring in the liberal arts and sciences, and the remaining third divided between business administration and engineering students. All of the *Ss* were

tested in class by their instructors approximately three weeks after the beginning of the semester.

Two of the above sections of introductory psychology had also been given the Extraversion scale from the Maudsley Personality Inventory (MPI) devised by Eysenck (3) and the Radicalism and Tendermindedness scales developed by Melvin (2, pp. 276-280). These three scales were administered approximately two months before the MIS attitude scale was used and a total of 92 Ss (56 men and 36 women) completed all four scales. The Extraversion and Neuroticism scales of the MPI (3) and Taylor's Manifest Anxiety Scale (6) were administered along with the MIS attitude scale to 86 Ss (41 men and 45 women) enrolled in two sections of introductory psychology not included in the normative sample described in the preceding paragraph.

Both scales were also administered to a small group of 16 members (12 men and 4 women) of a local science fiction society. Through the cooperation of the officers, the scales were administered to these Ss at a regular meeting of the society after a brief introduction and the purpose of the research was explained to the Ss after the administration had been completed.

### C. RESULTS

The first question concerned the reliability (internal consistency) of the information scale, which was not expected to be very high because of the diverse nature of the item content, and possible improvement of the scale reliability through item analysis. The answer sheets of the 100 male Ss of Group *A* were first scored and the reliability of the 25-item information scale estimated by use of Kuder-Richardson Formula 20. The resulting reliability coefficient was .45. The Ss in Group *A* were dichotomized on the basis of their total score on all 25 items and the proportions correct on each item in the upper and lower subgroups ( $N = 50$ ) converted to phi correlation coefficients. The 25 individual phi coefficients ranged from  $-.08$  to  $.54$  with the median phi being  $.16$ . Fourteen of the phi coefficients were significantly different from zero at the  $.10$  level or better with 9 being significant at the  $.01$  level. The 18 items with the highest correlation with the total score were selected as a possibly better (more reliable) information scale. The phi coefficients of the items included on this reduced scale ranged from  $.11$  to  $.54$  with a median correlation of  $.25$ . The answer sheets of the Ss in Group *B* (60 men) and Group *C* (40 women) were scored with both the 18-item and 25-item keys and *KR-20* reliability coefficients computed for each key and group. The reliability coefficients for the 25-item key in each



group were .46 and .45, while the comparable reliabilities for the 18-item key were .45 and .46. It is obvious that the item analysis failed to improve the reliability of the information scale. Consequently, the information scores used in later analyses are based upon the 25-item key. It is also noteworthy that the information scale was equally reliable for both the men ( $r = .46$ ) and women ( $r = .45$ ) *Ss* composing Groups *B* and *C*, although the mean score of the women ( $M = 11.02$ ) in Group *C* ( $N = 40$ ) was significantly ( $t = 2.89$ ) lower than the mean of the men ( $M = 12.55$ ) in Group *B* ( $N = 60$ ).

Two questions were involved in the preliminary analysis of the attitude items: which method of scoring the trichotomous attitude items would provide the most reliable scale, and could the scale reliability be improved by item analysis. Three responses could be made to each item: a favorable response (favorable toward the MIS program from an *a priori* keying of the items), an unfavorable response, or a neutral (?) response. Three possible scores could be obtained for each *S* on the 30 attitude items by quantifying his responses in different ways, i.e., the sum of his favorable responses ( $F$ ), the sum of his favorable plus the sum of his neutral responses, ( $F + N$ ), and the sum of twice the number of favorable responses plus the neutral responses weighted singly ( $2F + N$ ). This last score essentially considers each item as being responded to on a three-point rating scale with the favorable, neutral, and unfavorable responses being weighted 2, 1, and 0. The answer sheets of the 100 *Ss* of Group *A* were scored by all three methods and the reliabilities of the  $F$  and  $F + N$  scores computed by the conventional Kuder-Richardson Formula 20. The modification of the same formula for use with trichotomously scored items developed by Ferguson (4) was used to estimate the reliability of the  $2F + N$  score. The obtained reliability estimates were:  $F$ ,  $r = .73$ ;  $F + N$ ,  $r = .77$ ; and  $2F + N$ ,  $r = .77$ . The  $F + N$  score appeared to be as reliable as the  $2F + N$  score and practically more convenient: consequently, this was the score used in further statistical analyses.

The 100 *Ss* of Group *A* were dichotomized on the basis of total attitude scale score ( $F + N$ ) and an item analysis similar to that performed on the information scale was attempted. The 30-item phi coefficients ranged in magnitude from .00 to .52 with a median coefficient of .25. Twenty-two items were significant at the .10 level while 14 items were significant at the .01 level. The 22 best items were selected for a shortened scale. The items had phi coefficients between .18 and .52 with a median phi of .32. The answer sheets of the 100 *Ss* of Groups *B* and *C* were scored with both the original 30-item key and the new 22-item key and the comparable reliabilities

(KR-20) computed. The reliabilities of the 30-item key for the 60 men Ss of Group B and the 40 women Ss of Group C were .76 and .58, while the comparable reliabilities of the 22-item key were .70 and .61. As in the case of the MIS information scale, the shortened MIS attitude scale appeared to be no more reliable than the longer scale. Consequently, the 30-item key was used in subsequent analyses.

The normative data for both MIS scales can be found in Table 1. The

TABLE 1  
NORMATIVE DATA FOR THE MIS INFORMATION AND ATTITUDE SCALES

Group	Sex	N	Information scale			Attitude scale			Interscale correlation
			Mean	SD	r	Mean	SD	r	
A	M	100	13.08	2.57	.45	22.54	4.03	.77	.22**
B	M	60	12.55	2.54	.46	23.00	3.90	.76	.03
C	F	40	11.02	2.62	.45	22.45	2.96	.58	.28*
D	M	34	12.59	3.17	.66	21.94	4.60	.83	.32*
Total men		194	12.83	2.69	.49	22.58	4.10	.78	.18**

\*  $P < .10$ .

\*\*  $P < .05$ .

information scale variances from the four groups of Ss were tested for homogeneity by the conventional Bartlett test and the resulting chi-square value (3.05) was not significant ( $df = 3$ ). A simple one-criterion analysis of variance was used to test for significant differences among the means of the four groups and the difference between the means of the female Ss (11.02) and combined male Ss (12.83) was found to be significant at the .001 level ( $F = 14.96$ ,  $df = 1$  and 230). The variation among the means of the three men groups did not approach significance ( $F = .90$ ,  $df = 2$  and 230). A similar procedure omitting the female group (Group C) gives a chi-square value of 3.01 ( $df = 2$ ) in testing the homogeneity of the means.

The Bartlett test of the attitude scale variances gave S significant ( $P < .10$ ) chi-square of 7.14. Inspection of the group variances showed the variance of Group C (women) to be significantly small and the variances of the three groups of male Ss to be homogeneous (chi-square = 1.42,  $df = 2$ ). A one-criterion analysis of variance of the data from Groups A, B, and D showed the mean attitude scores of the male groups to be homogeneous ( $F = .72$ ,  $df = 2$  and 191).

The product-moment intercorrelations between the information and attitude scales for each sample are also given in Table 1. Although there is a considerable reduction in the magnitude of the interscale correlation in Group B ( $r = .03$ ) when compared with the other samples, all four correlations are in the positive direction and three of the four coefficients are



significant at the .10 level. The three coefficients from Groups *A*, *B*, and *D* were tested for homogeneity by the chi-square technique described by Edwards (1, p. 135). The obtained chi-square value (2.22) was not significant ( $df = 2$ ). The weighted average coefficient for the three groups of men *Ss* ( $r = .18$ ) was significant at the .02 level of confidence ( $z = 2.52$ ).

Two different criteria were used in testing the validity of the two MIS scales. Approximately two weeks after the MIS scales had been administered to the *Ss* the University announced that Mr. Willy Ley was going to give a talk to the students on the missile and satellite program. This lecture was one of a series of events held several times each week throughout the semester during the noontime period when no classes are scheduled. The impending visit by Mr. Ley was not mentioned in the classes tested on the MIS scales, but was widely publicized in the student newspaper and in printed announcements scattered over the campus. Within one to four days after the lecture the six introductory and applied psychology sections tested on the MIS scales were given a brief questionnaire asking whether they had attended the Ley lecture, what they thought of it, or why they hadn't attended it. Fourteen men and one woman had attended: consequently it was decided to analyze only the data from the male *Ss*. A total of 149 male *Ss* had completed the MIS scales and were present in class the day the Ley questionnaire was given. The mean score on the MIS information and attitude scales were obtained for those attending the lecture ( $N = 14$ ) and those not attending ( $N = 135$ ). The difference between the means of the two groups was tested for significance by a *t*-test and a point-biserial correlation coefficient was computed between the dichotomous attended-nonattended criterion and the MIS scale scores. The second criterion used was membership in a local science fiction club. The mean scores of the members ( $N = 16$ ) on the MIS scales were compared with the mean scores of the normative student samples ( $N = 234$ ). Point-biserial correlation coefficients were also computed against this members-students criterion and the significance of the correlations tested by *t*-tests between the pairs of means. The results of these tests of the validity of the MIS scales can be found in Table 2. Four of the six validity coefficients are significant at the .01 level and one additional coefficient is significant at the .10 level. Only one correlation, the MIS attitude scale against the lecture criterion ( $r = .01$ ) is not statistically significant. Inspection of the validity coefficients suggests two generalizations: (a) the MIS information scale, in spite of its lower internal consistency reliability (see Table 1), is a more valid measure than the MIS attitude scale, and (b) membership in the science fiction society was a more adequate criterion than



TABLE 2  
VALIDITY OF MIS INFORMATION AND ATTITUDE SCALES

Criterion measure	Criterion group	Sex	N	Information scale			Attitude scale		
				Mean	r	t	Mean	r	t
Lecture attendance	Attended	M	14	14.14	.14	1.91*	23.07	.01	.16
	Nonattended	M	135	12.81			22.90		
SF Society membership	Members	M	12	18.25	.43	7.29**	25.42	.16	4.78**
	Students	M	194	12.83			22.58		
	Members	F	4	18.25	.60	3.06	26.50	.37	3.01**
	Students	F	40	11.02			22.45		

\*  $P < .10$ .\*\*  $P < .01$ .

attendance at the Ley lecture. Many of the students who failed to attend the lecture reported that they had failed to hear of the lecture and would attend if it was repeated, suggesting that the lecture attendance criterion was contaminated by error variance attributable to chance knowledge of the impending lecture. If all of the Ss had been aware of the lecture it is possible that the validity coefficients would have been higher.

Product-moment correlations between MIS attitude scale scores and scores on the temperament dimensions of Extraversion, Neuroticism (3), and Manifest Anxiety (6), and the social attitude dimensions of Radicalism and Tendermindedness (2) were computed for two groups of student Ss. Comparisons of the mean scores of the sex groups indicated that the women Ss within both groups of students had significantly higher Extroversion scores; consequently separate correlations were computed for each sex group. The obtained correlations can be found in Table 3. None of these correlations approached significance as can be seen from the average (unweighted)

TABLE 3  
CORRELATIONS BETWEEN MIS ATTITUDE SCORES AND SEVERAL TEMPERAMENT AND SOCIAL ATTITUDE SCALES

Questionnaire variables	Men			Women		
	N	Mean	r	N	Mean	r
Extraversion	41	25.07	-.10	45	28.42	.11
Neuroticism	41	19.73	.00	45	21.58	.12
Manif. anxiety	41	14.39	-.16	45	16.04	.10
Extraversion	56	27.23	.06	36	30.44	.05
Radicalism	56	5.95	-.04	36	5.22	-.11
Tendermindedness	56	15.27	-.12	36	16.89	.19

correlation of each scale with MIS attitude: Extraversion, .00 and .06; Neuroticism, .06; Manifest Anxiety, —.03; Radicalism, —.07; and Tender-mindedness, .03.

#### D. DISCUSSION

The 30-item attitude scale developed in this research appears to be a promising instrument for the assessment of MIS attitudes. The reliability of the scale is not as high as one would like and the failure of the attempt to improve its reliability by internal consistency item analysis indicates that this is not a profitable method of improving the scale. A better approach would be through a factor analysis of item intercorrelations. Inspection of item content suggests that the scale is factorily complex with several major and possibly several minor independent dimensions being present. Factor analysis would permit a purification of the scale or isolate subscales with higher internal consistency. However, even this original scale gave some evidence of validity when tested against the rather crude criterion measures used here. The problem of developing adequate behavioral criteria for attitude research has always been a particularly difficult problem and one that is usually ignored in the development of attitude scales. Both of the traditional methods of validation, i.e., comparison of groups that may be *a priori* assumed to be different in attitudes and the prediction of future behavior in a field situation, were attempted without spectacular success, but with some encouraging evidence.

The low correlations between the three temperament measures used here, Extraversion, Neuroticism, and Manifest Anxiety, suggest a lack of relationship between these types of personality traits and favorable MIS attitudes. These scales are quite reliable and appear to have some validity in other published research. The hypothesis that favorable MIS attitudes are related to neurotic "flight from reality" is not supported by our data. The alternative hypothesis, that MIS attitudes are a reflection of more general social attitudes, is likewise not supported by the results. However, our confidence in these data is attenuated by the inadequacy of Melvin's Radicalism and Tendermindedness scales for our samples of U. S. college Ss. Application of Kuder-Richardson Formula 21 to the data reported in Table 3 indicates that the 16-item Radicalism scale had estimated reliabilities of .21 and .46 for the two samples of men and women Ss while the 32-item Tendermindedness scale showed reliabilities of .62 and .43. While the use of this formula provides only a minimal estimate of the internal consistency reliability of these scales, it does suggest that the low correlations with MIS attitude may be due to unreliable measuring instruments. Perhaps more

reliable measures of social attitudes would have shown larger relationships to the MIS attitude variable.

It should be emphasized that we regard this MIS attitude scale as only one instrument for assessing the impact of the MIS program on public attitudes. Other instruments will have to be developed to measure other facets of this attitude complex. For example, a related area lies in assessing the attitudes toward and stereotypes concerning the research scientist. Another attitude component may be more general attitudes toward science and its effect on society. Perhaps all of these approaches may measure the same basic attitude dimension, but at this point such a view is sheer speculation.

#### E. SUMMARY

Scales for measuring attitude toward and information about the current Man-Into-Space program were developed and administered to 336 Ss. The correlations between MIS attitude and information scores were low, but statistically significant with the correlation for male college Ss ( $N = 194$ ) being .18 and for female Ss ( $N = 40$ ) being .28. Both scales were validated by (a) comparing the scores of Ss who did and who did not attend a lecture on earth satellites, and (b) by comparing the scores of college Ss with scores of members of a local science fiction society. Four of six validity coefficients were significant at the .01 level. Correlations of MIS attitude scores with measures of Extraversion, Neuroticism, Manifest Anxiety, Radicalism, and Tendermindedness were uniformly low and statistically non-significant.

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## TELEVISION WITHIN THE SOCIAL MATRIX: II. TRENDS AFTER 18 MONTHS OF OWNERSHIP\*

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In an earlier study, Hamilton and Lawless (1) investigated the possibility that television is a social factor responsible for a changing contemporary personality. It was suggested that television viewing will become an integral part of the social milieu within which the personality grows and develops. Within the framework of the general action theory of personality (2), the first study used a questionnaire that was designed to elicit responses that could be categorized into the structural and functional areas of the three established systems of action.

The first of these systems of action was concerned with the *personality system* and referred to the autogenous influences originating within the individual. The sub-factors were determined as (a) personal habit orientation (which included questions about sleeping habits and eating routine), (b) cathexis for television (questions concerning social activities), and (c) the expressive component of personality (hobby activities and personal telephone habits).

The second system of action was concerned with the *social system* and involved (a) role-expectation (family activities, person selecting programs, disagreement over programs, and household chores), and (b) evaluation of social worth (which was determined by further interpretation of the data on social activities).

The third system was termed as the *culture system* and was concerned with (a) value-orientation patterns (the importance of television), (b) cognitive symbols (religious activities), and (c) expressive symbols (choice of programs).

The first study, which was conducted after television had been in the community approximately six months, suggested that television had some definite and immediate impact upon the social matrix and the personality operating within this matrix. It was further suggested that only prolonged study would indicate the rightful place of television in this matrix. Toward

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this end, a follow-up study was instituted to determine, if possible, the trends to the acceptance of this technological change upon the cultural patterns.

The present study was so designed as to secure an equal number of television families within the same "block-cluster" as the original study. The original questionnaire was re-administered to a matched sample of television-viewing families. Care was taken to reinterview the same television family, if possible, and where this was not possible to secure a television family within the same tract-block and who possessed equivalent qualifications (sex, age, number of children, socio-economic index number, etc.).

This study was conducted after television broadcasting had been in the community approximately 18 months (one year after the original study). There were three stations (one VHF and two UHF) that were telecasting at regular morning, afternoon, and evening hours.

The present report will attempt to present graphically, the trends of acceptance or rejection of television after 18 months of telecasting. It is proposed that this interim period should allow for the initial impact of novelty, newness, and vogue, which may have influenced the respondents in the original study. Thus we shall present percentages of responses in the various categories for non-television families, television families after six months of available telecasting, and television families after 18 months of available telecasting. To simplify the discussion and presentation, the following symbolization will be used: Non-TV, TV<sub>6</sub>, TV<sub>18</sub>, respectively. Chi square or  $t$  tests were used to determine the appropriate statistical significance throughout this study: Where the significance of trend or difference is specifically mentioned, the confidence interval is at less than the 5 per cent level.

Figure 1 indicates the responses categorized in the *personality system*, under the sub-category "personal-habit orientation" and included sleeping habits, eating routine, and expressive components. In regards to sleeping habits (Figure 1, Chart A), we were most particularly interested in the differences in times of arising and retiring between spouses, using 30 minutes as a critical time to determine the difference. While there were greater differences in sleeping habits between the spouses on week days than on week ends, these differences were not significant.

There was no significant trend regarding the routine of eating at a regular time (Figure 1, Chart B). There was, however, considerable variation in the type of activity engaged in while eating. Viewing television while eating

was non-existent for the TV<sub>18</sub> respondents; this fact was also true for radio listening and reading at the table. However, mealtime conversation continued on the increase for the television families, and a significantly large percentage of TV<sub>18</sub> respondents reported that they did *nothing* but eat at the table. It is possible that mealtime becomes a welcome relief from television viewing, and allows an opportunity for expressing oneself or it becomes a sanctuary for meditation.

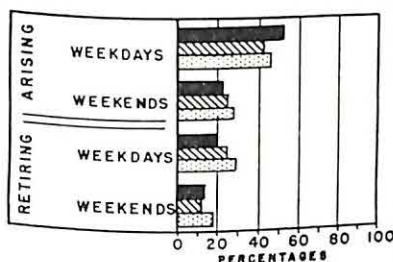


CHART A. DIFFERENCES IN SLEEPING HABITS BETWEEN SPOUSES

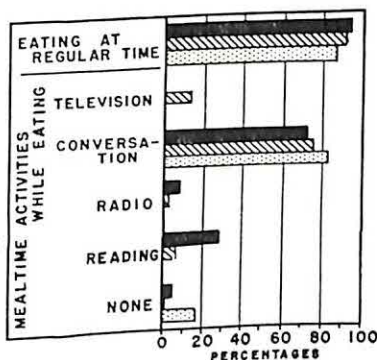
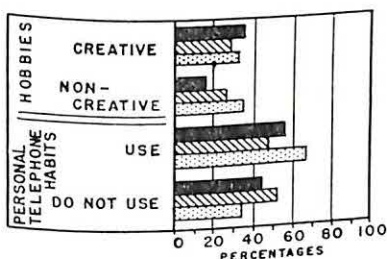


CHART B. MEALTIME HABITS



LEGEND  
 ■ NON-TELEVISION  
 ▨ TELEVISION - 6 MOS.  
 ▩ TELEVISION - 18 MOS.

CHART C. EXPRESSIVE COMPONENTS

FIGURE 1  
 PERSONAL-HABIT ROUTINE WITHIN THE PERSONALITY SYSTEM

The differences in responses (Figure 1, Chart C) regarding time spent with hobbies between the two television samples were not significantly different. The Non-TV respondents reported considerably less total time spent with hobbies than either of the television respondent groups. It is possible that television viewing offers opportunities for creative thinking and stimulates interest in avocational activities.

It was also apparent from Chart C, that the TV<sub>6</sub> respondents reported



spending less time in personal telephone conversations than the other two samples, indicating, perhaps, an initial impact interference of television. A reversal in trend was noted for the TV<sub>18</sub> respondents when they reported a significant increase in time spent on the telephone over the TV<sub>6</sub> group, and a slight increase over the Non-TV group.

Questions concerning social activities gave an opportunity to explore the respondents cathexis for television. Figure 2 indicates a tendency for the TV<sub>18</sub> group to resemble the Non-TV group in all aspects of the area of social activities. Actually no significant difference existed between the percentage of responses of the two television samples, either in time spent in interacting with friends or in the type of activities while in social situations. There were some significant differences between each of the television groups and the Non-TV group.

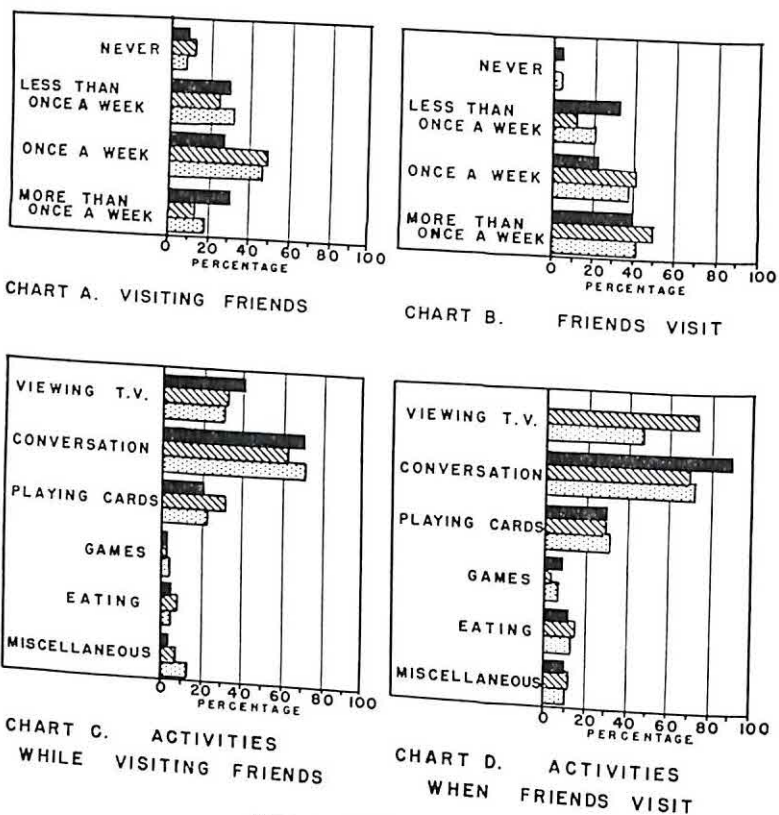


FIGURE 2  
CATHESIS FOR TELEVISION AS REVEALED IN SOCIAL ACTIVITIES

In regards to the types of social activities, again it was noted that the pattern of responses of the TV<sub>18</sub> group tended to resemble that of the Non-TV group. In spite of this, however, there was a statistically significant difference in the grouping of responses. Viewing television, apparently, does not remain the principal form of entertainment when friends visit the TV<sub>18</sub> group. The respondents claim that they entertain their friends more when they come over for a visit by other activities such as games, playing cards, social chit-chat, eating, etc. It was interesting to note that all the respondents reported that they provided more entertainment for their friends than they received when visiting friends. Apparently the host and hostess perceive their jobs in entertaining as more difficult and remember their menial tasks in attempting to be good entertainers and somehow repress these same tasks when visiting their friends.

The area of role-expectation within the social system was explored by inquiries into time spent in family activities and the decisions concerning the programs to be viewed or listened to. Figure 3, Chart *A*, shows that the TV<sub>6</sub> respondents reported a significant increase in time spent on family activities over the Non-TV respondents. When one notes the patterning of responses of the TV<sub>18</sub> group it is clear that the trend is to resemble that of the Non-TV group. These differences were significant. Perhaps the over-reporting of time spent in family activities on the part of the TV<sub>6</sub> respondents reflects some sort of guilt in relation to television ownership. This is further reflected by an inspection of the data regarding the types of family activities (Figure 3, Chart *B*). Whereas many of the TV<sub>6</sub> respondents reported the viewing of television as a family activity (similarly Non-TV respondents reported movies as a form of family interaction) the TV<sub>18</sub> respondents were more realistic by stating that family time was spent in a myriad of activities such as picnics, games, eating out, etc. The variance of responses regarding family activities were significant between the Non-TV group and each of the TV groups, but not between the TV groups.

Most of the respondents in all three groups reported mutual respect of the family when deciding upon the family activity (Figure 3, Chart *C*). In regards to a single family member influencing the family decision, it is noted that the mother-wife was most dominant in the Non-TV group and becomes least dominant in the TV<sub>18</sub> group. The father-husband's role remains almost unchanged, but the child becomes more dominant in status. There was some evidence of the father-husband and mother-wife teaming up in the TV<sub>18</sub> group. The differences in responses in this area were significant between the TV<sub>18</sub> group and the other two groups but not between Non-TV and TV<sub>6</sub> groups.

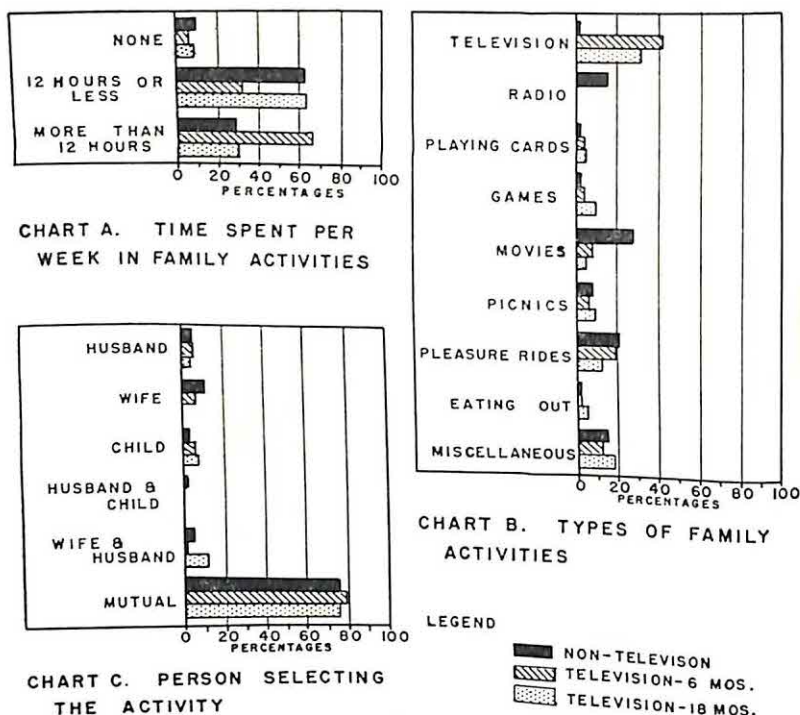


FIGURE 3  
ROLE EXPECTATION DETERMINED BY FAMILY ACTIVITIES

That the mother-wife lost her dominance in the family is substantiated in part by data in Figure 4. This is especially true for the selection of programs (Figure 4, Chart A), however the TV<sub>18</sub> respondents report a tendency for the mother-wife to regain her autocratic role. Mutual agreement in selection of programs makes for a democratic home-atmosphere, according to the respondents, and has a tendency to increase for the TV<sub>18</sub> settling disagreements over the selections of programs. In this instance the mother-wife loses her composure slightly but regains it in the TV<sub>18</sub> group. The child steadily gains in status as television becomes a household necessity.

The differences in patterning of responses were significant between Non-TV and TV<sub>6</sub> groups, but were not statistically significant elsewhere. There were no significant differences in the percentage of respondents reporting conflict over selecting the program.

It was anticipated that time spent in household chores would give some indication of role-status within the family constellation. Figure 4, Chart B,



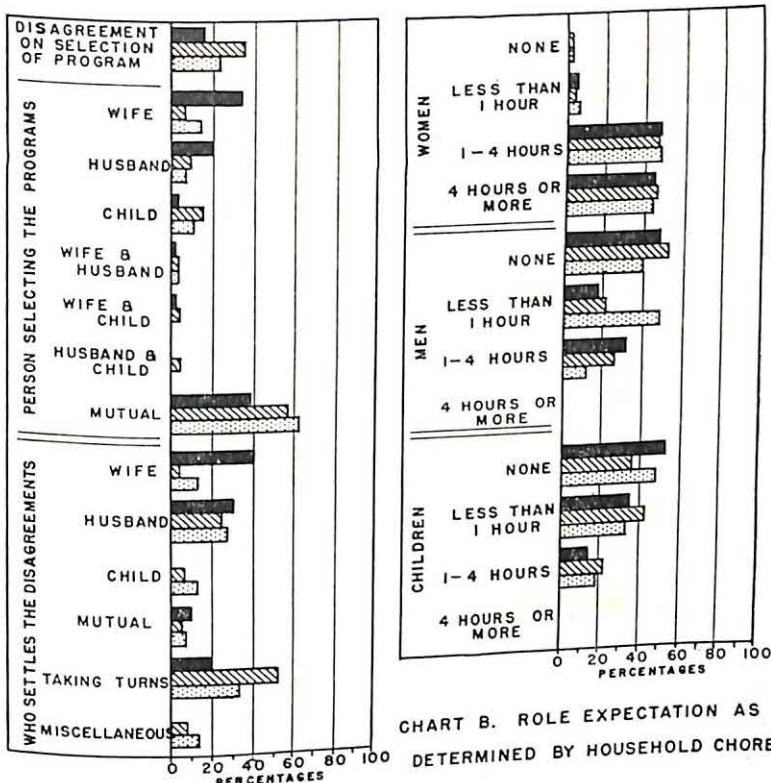


CHART A. ROLE EXPECTATION DETERMINED BY SELECTION OF PROGRAMS

CHART B. ROLE EXPECTATION AS DETERMINED BY HOUSEHOLD CHORES

LEGEND

NON-TELEVISION  
TELEVISION 6 MOS.  
TELEVISION 18 MOS.

FIGURE 4  
ROLE EXPECTATION

shows that all of the respondents reported a significant difference in the amount of time spent in performing household chores. All of the groups stated that the majority of father-husbands and children spent *less* than one hour per day on chores. This was not true for women. It was obvious that the trend was for men to spend less time on chores than before the advent of television in this community. The TV<sub>18</sub> group differed significantly from the other two groups. The other differences were not significant.

A reinspection of the social activities data (Figure 2) from the point of view of *social worth*, indicates that television no longer is symbolic of high status in the community. No longer is it a "fashionable" mode of entertainment. Rather, it has become a commonplace household commodity and has somehow lost its value to the personality.

Within the framework of the *culture system* (Figure 5), this study attempted to explore the factor of *value-orientation*. Questions were asked so as to elicit responses regarding the importance of television. Figure 5, Chart A, indicates the percentage of respondents in each of the groups who indicate a liking for television. While a majority of the television informants placed a positive value of worth on television, in contrast to Non-TV informants, there was a trend for the TV<sub>18</sub> group to express negative feelings regarding television. The difference in percentage of responses was significant between the Non-TV and the two TV groups, but not between each of the TV groups.

The reasons for liking or disliking television were varied (Figure 5,

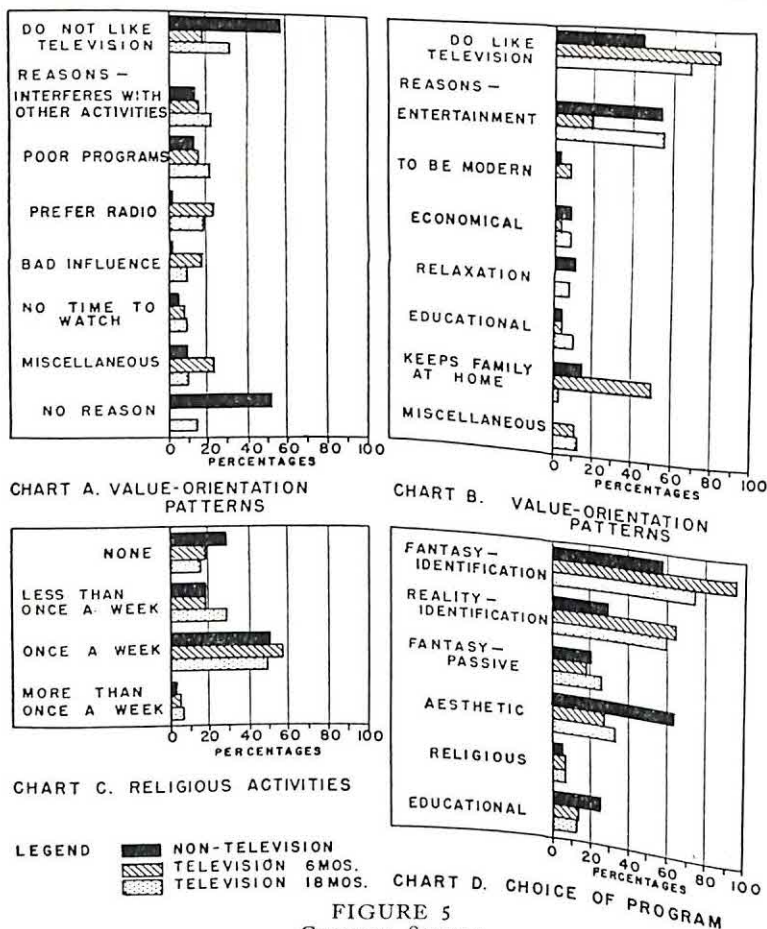


FIGURE 5  
CULTURE SYSTEM

Charts *A* and *B*). The TV<sub>18</sub> respondents tended to place the blame on poor programs or that television interfered with other activities. The Non-TV respondents refused to give reasons for their statements, whereas the TV<sub>6</sub> group thought that television was a bad influence on the family or that they preferred radio. The difference in patterns of responses was significant between the Non-TV and each of the TV groups, but not between the TV groups themselves.

It was interesting to note that the Non-TV group reported that they would like to own a television set because of the entertainment value or that it would be relaxing. The TV<sub>6</sub> group, on the other hand, stated that it would keep the family at home, or gave other varied reasons. There was a tendency for the pattern of responses of the TV<sub>18</sub> group to resemble the Non-TV group, especially where the respondents in this group decided that television was primarily valuable for its entertainment value and was not instrumental in keeping the family at home. Economy, relaxation, and education were some of the other reasons reported.

There was no significant difference between the pattern of responses of the Non-TV and TV<sub>18</sub> groups. There were significant differences between the TV<sub>6</sub> group and each of the other two groups.

This study considered that time spent in religious activities would reveal a concern with *cognitive symbols*. Specific questions concerning time spent in Sunday school, church, and other church activities were asked. While there is a tendency for the TV<sub>18</sub> respondents to report an increased interest and activity in church work (Figure 5, Chart *C*), the only significant differences were found between the Non-TV group and the TV<sub>18</sub> group.

The area of *expressive-symbol* system was explored by determining the nature of the choice of programs by each group. The data from Figure 5, Chart *D*, indicates a tendency for the television groups to express a liking for the type of program that easily enabled the dynamic mechanism of identification. At the same time, there was a trend for the TV<sub>18</sub> group to express fewer responses of choice for the identification programs.

Unlike the original study, the fantasy component within itself seems to have more importance for the TV<sub>18</sub> group, especially since there is an increase in choices in the fantasy-passive area. Likewise, where there was a loss of interest in the aesthetic-viewing of the world by television owners in the TV<sub>6</sub> group, there is some rejuvenation of interest on the part of the TV<sub>18</sub> group. Educational programs continued downward and choice for religious programs remained about the same.

The patterns of responses did not vary significantly between the television



groups, but was significant between the Non-TV group and each of the television groups.

In summary, it appears that television is becoming absorbed within the action system of the personalities of our culture. It continues to interfere only slightly with the habit-routine-pattern of culture. As television becomes an accepted and needed part of our cultural pattern it is evident that variation in responses becomes less and less. It is only in very specific areas that the respondents in this study changed their responses after an additional 12 months exposure to telecasting.

On the other hand, more extreme differences in responses between the respondents who owned television and those who did not own television were noted. This offers speculation that perhaps technical change in culture brought about by television is not as traumatic or devastating as earlier suspected, but that it is taken in by the personality through the normal adjustive process.

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## NORM COMPATIBILITY, NORM PREFERENCE, AND THE ACCEPTANCE OF NEW REFERENCE GROUPS\*

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### A. PROBLEM

It is an inevitable aspect of life in most societies that man should change his reference groups. Changes in status defined by a wide variety of factors (e.g., age, economics, vocational functioning, marital role, etc.) are inescapably accompanied by shifts in reference groups. Understanding the dynamics of such shifts should contribute much to our total understanding of man in his social milieu, and eventually, to our ability to master that social milieu for the benefit of the individual more effectively.

Of the available studies focussing on the functioning of reference groups, most are concerned with the *effect* of such groups, very few with the *process* by which a new group comes to fill the role of a reference group for an individual. The study reported in this paper is one of a series of pilot investigations focussing on the factors associated with the dynamics of acquiring new reference groups. The results of several of these investigations have been reported elsewhere (5, 6, 7, 8, 9, 10). Here we shall report an investigation of the relationship of the perceived congruity between the *mores* of an individual's established groups and those of a new membership group to the acceptance of the new group as a reference group.

In most discussions of the functioning of reference groups, the assumption is made that the individual accepts as guides for his own behavior the standards and norms characteristic of his reference groups. This assumption has been supported by a variety of studies, especially those concerned with attitude formation and attitude change (13, 14, 15). Only a few investigators, however, have concerned themselves with the part played by the norms and standards of a given group in making it acceptable as a reference group. Yet we know from common usage that this role is an important one. We

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<sup>1</sup> The data reported here were collected as part of an exploratory program of studies focussing on the personal and social components associated with the acceptance of new groups as reference groups, conducted under Contract Nonr-1597(01) with the Group Psychology Branch Office of Naval Research. We wish to acknowledge with thanks the participation of John Kunz in the capacity of research assistant in this phase of the project.

speak of "our kind of people" or feeling "out of place" or "at home" in a new group to indicate a perceived congruence (or lack of it) with previously established standards of behavior.

Fragmentary findings from a number of research studies suggest that this area is an important one for systematic investigation. Newcomb, for example, reported a perceived gap in values and standards between established groups and a new group as inhibiting the acceptance of the new group for some college-age subjects (13). Becker and Carper found that compatibility of standards and norms with personal inclinations influence identification with vocational groups (2, 3), and Eisenstadt has found this factor important in the successful assimilation of immigrants to their new national group (4).

Most of the findings mentioned above were by-products of studies with other objectives. Systematic investigations of the operation of norm congruity as related to reference group acquisition are still lacking. To help fill this gap, the present investigator proposed the following hypotheses for testing: (a) In general, the greater the perceived difference in norms between an individual's established groups and a new nominal membership group, the less readily the individual is likely to accept the new group as a reference group. (b) The degree of acceptance of a new group will be positively related to the degree of preference for the norms of that group, without regard to existing relationships between the norms of the new group and established groups.

A number of assumptions are implied in the above hypotheses. These may be stated briefly as follows:

Most adults or adolescents have an established hierarchy of reference groups. Accepting a new group can be expected to be accompanied by a reevaluation of those previously established, and to place the latter in temporary competition for the individual's loyalty. The process by which a new group becomes a reference group could therefore be expected to subject the individual to competing pulls and the decision of the issue would depend on the balance of forces acting on him.

Individuals, however, do not necessarily join new groups because they are seeking like-minded companions. Their overt objectives may be entirely pragmatic, ulterior, and removed from any consideration of compatibility. The new group may be considered a tool for the achievement of compatibility-objective removed from the immediate membership, or nominal membership may be forced on the individual. The transformation of the new group from one of nominal membership to one serving a reference function, however, may depend to a critical extent on its compatibility with aspects of the indi-



vidual's previous experience and his personal preferences. The pattern of accepted norms of behavior is assumed to be one of the crucial elements in that experience. Hence the congruity among the norms of established and new groups appears logically to be an important catalytic element involved in the transformation process.

## B. METHOD

### 1. *Subjects, the New Group, and the Established Groups*

Subjects were 146 unselected male freshman students enrolled in the College of Liberal Arts and Sciences of a municipal, tuition-free college in an urban setting. Since their membership in the college community was of recent occurrence, the College seemed an appropriate unit to use as the new group; off-campus associations were assumed to comprise the subjects' established groups. Most of the subjects commuted daily from their homes to the college and continued to maintain some contact with their home neighborhoods. This fact was assumed to heighten the subjects' awareness of differences in norms where such differences existed, and to make these subjects a peculiarly appropriate population for testing the hypotheses presented.

### 2. *Measures of Norm-Congruity and Preferences*

For the purposes of this study "norms" were defined as "ways of behaving." A list of 15 items, which were judged to be substantively meaningful for our population, was drawn up on the basis of intensive interviews with a selected sample of students conducted during the exploratory phase of the general project. These items were presented to the subjects, together with a set of instructions for responses to be made on answer sheets designed for machine scoring, as follows:

Below is a list of kinds of behavior which may vary between one group and another. We would like to know if there is a difference between students at \_\_\_\_\_ and your off-campus friends and associates with respect to these items. If there is a difference we also would like to know which way of behaving you prefer. Please note both parts of the instructions below.

I. For each item please mark the answer sheet in the space that represents what you think, according to the following scale:

- A = there is no difference or a very slight difference between the two groups in this respect.
- B = there is a moderate difference between the two groups in this respect.
- C = there is a large difference between the two groups in this respect.

II. For every item which you answer *B* or *C* on the answer sheet, also fill in *D* or *E* on the answer sheet, whichever is appropriate according to the description below:

*D* = I personally prefer the attitude of my off-campus friends and associates in this respect.

*E* = I personally prefer the attitude of students at \_\_\_\_\_ in this respect.

1. How one behaves toward friends of the same sex.
2. How one behaves toward friends of the opposite sex.
3. One's attitude toward people older than one's self—parents, teachers, employers, etc.
4. The importance of dress and grooming.
5. Attitude toward one's studies.
6. The kind of language one uses.
7. The importance of having high ambitions or goals.
8. Showing that one is keeping up with the latest fads and fashions.
9. The degree of interest one shows in sports.
10. The attitude one has toward religion.
11. The kinds of things one talks about.
12. Preferences in types of music.
13. Where one goes on dates.
14. Where one hangs out during any spare time.
15. The interest one shows in political affairs.

Acceptance of the college as a reference group was measured by a questionnaire especially designed for this purpose, composed of 58 multiple-choice items and having a corrected reliability coefficient of .82 (Spearman-Brown formula). The items covered six aspects of reference-group feeling and behavior: personal involvement, valence of the group, influence of the group, public identification, interaction with the group, and evaluation of the group. The following are sample items for the first five aspects: "If you were to learn from the newspapers that \_\_\_\_\_ had been attacked by a Congressman or Senator, how would you feel about it?" "Would you like to spend more time at the \_\_\_\_\_ if you could?" "If you were looking for people who might serve as models to pattern yourself by, among which of the following groups do you think you would most probably find such models?" "When you are introduced to a new group, and the person introducing you says, 'He (she) goes to \_\_\_\_\_,' how do you honestly feel?" "How active are you in the groups (formal and informal) with which you are connected here?" This questionnaire had been validated in a previous investigation by two methods: (a) reference to actual sub-group participation of subjects scoring at the upper and lower extremes of the response range, and (b) interview follow-ups of "high" and "low" acceptors.

It had also been demonstrated to be reasonably immune to the operation of response set (5, 7). This questionnaire had demonstrated its usefulness in several other studies of this series (7, 8, 10).

### 3. *Procedures of Administration, Scoring, and Statistical Analysis*

Both questionnaires described above were administered to several sections of the Freshman Orientation course during two regular sessions of the Orientation program. An interval of a week occurred between administering the acceptance questionnaire and the norms items. The latter were imbedded in a much longer questionnaire form containing items designed to give information about personal values, personal needs, and generalized satisfaction-dissatisfaction. All questionnaires were administered after students had been members of the college community somewhat less than three months. The time for gathering the data was chosen on the assumption that a period of contact of about 2½ months gave the subjects sufficient time to familiarize themselves with the College but was short enough so that the difference between those who accepted the group readily and those who were reluctant to do so would be most evident. Experience had shown that such differences tended to become less marked with the passage of time; in addition, waiting until the second semester to gather data could result in the loss of a significant number of subjects from the lower end of the range of acceptance scores.

The norms items were scored in two different ways. A *gross difference score* was derived by assigning a value of 0 to the *A*, 1 to the *B*, and 2 to the *C* choices and totalling these responses; the larger the score, the greater the perceived difference between the new and the subjects' established groups. A *gross preference score* was worked out by assigning a value of 0 to *D* responses, and of 1 to *E* responses, totalling the items, and dividing the total by the sum of the *D*'s and *E*'s marked: this score represented the ratio of college-oriented preferences to all preferences possible.

Product-moment correlations between each of the norms scores and the acceptance score, as well as intercorrelations among the norms scores, were used to test the hypotheses. Correlations between the norms scores and other measures administered at the same time (mentioned above) gave evidence concerning the presumptive validity of the former and added to our understanding of their functioning.

### C. RESULTS AND DISCUSSION

In Table 1 we present the product-moment correlations between each of the scores derived from the norms questionnaire and the scores achieved on the acceptance measure.



TABLE 1  
PRODUCT-MOMENT CORRELATIONS BETWEEN NORMS SCORES AND ACCEPTANCE OF THE  
NEW GROUP  
(N = 146)

Score	r	p
Gross difference	-.26	< .01
Gross preference	.17	< .05

Both correlations are significant, though low, and occur in the expected directions. We interpret these results to indicate substantiation of our hypotheses.

The correlation between the two norms scores was .17 ( $p < .05$ ).

An estimate of the presumptive validity and the meaning of a specific measure may sometimes be derived from the pattern of its intercorrelations with other measures. The significant correlations between our norms scores and other measures administered to the same subjects are therefore presented in Table 2. All correlations shown in Table 2 are significant above the level of  $p = .01$ .

TABLE 2  
SIGNIFICANT CORRELATIONS BETWEEN NORMS SCORES AND ADDITIONAL MEASURES

Scores correlated	r
1. Difference and C-need satisfaction <sup>a</sup>	
2. Difference and OC-need satisfaction <sup>b</sup>	-.22
3. Difference and generalized satisfaction-dissatisfaction <sup>c</sup>	-.26
4. Preference and OC-need satisfaction <sup>b</sup>	-.27
5. Preference and C-OC need satisfaction "balance" score <sup>d</sup>	-.33
6. Preference and S-OC value congruity <sup>e</sup>	.33
	.22

<sup>a</sup> A measure of the extent to which the College community satisfies subject's personal needs (8).

<sup>b</sup> A measure of the extent to which subject's personal needs are satisfied by his off-campus groups and associates (8).

<sup>c</sup> A measure of generalized satisfaction-dissatisfaction with the culture (6).

<sup>d</sup> A measure of the relative extent to which the College community fills subject's personal needs when compared with the subject's off-campus groups and associates (8).

<sup>e</sup> A measure of the congruity between the subject's personal values and the perceived values of his off-campus groups and associates. This was derived so that a large S-OC score indicated large differences or a relative lack of congruity in perceived values (9).

The three significant correlations shown by the difference scores are all negative and are all associated with measures of satisfaction. Specifically, these correlations indicate that the tendency to report large differences in norms between established groups and the new group is associated with a

tendency to report relatively little satisfaction of personal needs, either in the new group (*C*-need satisfaction) or in the previously established groups (*OC*-need satisfaction), and to be relatively dissatisfied with one's general cultural setting. These data suggest that those of our subjects who perceived large differences in norms between their old and new groups tended to be among the chronically dissatisfied.

The logical consistency of the patterns of significant correlations shown between the preferences scores and other measures in Table 2 gives further evidence that preference for the norms of a new group is likely to be associated with perceived incompatibility with established groups. For example, the negative correlation ( $r = -.33$ ) with *OC*-need satisfaction scores indicates that a tendency to prefer the College norms is accompanied by a relatively low level of satisfaction of personal needs by off-campus groups. The positive correlation with the *C-OC* need satisfaction "balance" scores ( $r .33$ ) supplies the corollary that the College community is perceived to contribute relatively more to the satisfaction of personal needs than are off-campus groups, by subjects who prefer the norms of the College. Finally, we find that preference for College norms is associated with a relatively large difference between the individual's values and those he perceives as characterizing his off-campus groups and associates.

We have one additional bit of evidence bearing on the dynamics of the norms scores to consider. Three of the additional measures administered to our subjects made use of five-point response scales going from "extremely well satisfied" to "not satisfied at all." From these we derived a "positive response tendency" score for each subject by adding up the number of times he chose the "extremely well satisfied" response. (We shall refer to this as the p.r.t. score hereafter.) Since the "extremely well satisfied" response also could enter into each subject's specific score for each of the measures which were combined for its derivation, the p.r.t. score cannot be regarded as an entirely independent measure, and may well be tainted by the subject's actual attitudes toward the substance of the items to which he was responding. Despite this fact, in consideration of current preoccupation with the possibility of the operation of "response tendencies" to the detriment of clarity in the meaning of data, a sensitivity indicated by the number of recent publications concerned with this topic (1, 11, 12), we believe it would be relevant to the purpose of this paper to note the relationships between the p.r.t. scores and others with which we are here concerned. Table 3 presents the correlations between the p.r.t. scores and the norms scores.

We interpret these data to indicate the lack of operation of a positive

response tendency in relation to the norms measures. If any general tendency is operating, it is in a negative rather than a positive direction.

TABLE 3  
CORRELATIONS BETWEEN P.R.T. SCORES AND NORMS MEASURES  
( $N = 146$ )

Measure	r	p
1. Gross difference in norms	-.23	< .01
2. Gross preference for college norms	-.09	*

\* Not significant.

#### D. SUMMARY

This paper reports an investigation of the relationship between perceptions of norm-congruity, norm-preference, and the acceptance of a new group as a reference group. Subjects were 146 male freshman college students, who reported (a) the amount of difference they perceived in normative behavior in 15 selected areas between their established groups and the College, considered here as the new group, and (b) which norms they preferred. Two scores were derived from these materials: a gross preference score and a gross difference score. Correlations with a measure of acceptance of the College indicated that perception of relatively large differences in norms between established groups and the new group were associated with relatively less acceptance of the new group as a reference group. Preference for the norms of the new group, however, was positively associated with acceptance of it as a reference group. Intercorrelations between the norms scores and several measures of need-satisfaction and value-congruity indicated that preference for the norms of the new group was associated with a relative lack of need-satisfaction by other groups and a perceived lack of congruity between the individual's values and those of other groups.

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## THE EFFECT OF RELIGIOUS MEMBERSHIP ON RELIGIOUS PREJUDICE\*

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### A. PROBLEM AND HYPOTHESES

The recent emphasis upon studies of racial prejudice has tended to obscure the importance of other aspects of prejudice, such as religious prejudice, which are no less worthy of study. With this view in mind the present study was undertaken in order to extend previous findings in the area of religious prejudice as well as to generalize certain relationships that have been established for racial prejudice to the field of religious prejudice.

The hypotheses of the study were as follows:

1. Persons who belong to religious organizations are more prejudiced against religious groups than persons who do not belong to such organizations.
2. Members of religious groups are less prejudiced against themselves than are members of other religious groups against them.
3. Members of religious groups are less prejudiced against members of their own group than against members of other religious groups.
4. Religious prejudice is a generalized attitude.

Partial support is supplied for the first hypothesis by Frenkel-Brunswick and Sanford (3) and Levinson and Sanford (5) who found that persons with strong religious affiliations are more anti-semitic than persons without such affiliations. The relation between religious affiliation and anti-catholicism and anti-protestantism does not appear to have been studied previously and was therefore examined in the present study. The second and third hypotheses are directly suggested by studies of religious ingroup preference, such as those by Zelig (7) and Festinger (2). These studies have not, however, included Protestant subjects in their sample as was done in the present study. The final hypothesis is derived from the finding that racial prejudice appears to be a generalized attitude rather than a specific reaction to a given race (1). The hypothesis was formulated because similar studies do not appear to have been made to determine the generality of religious prejudice.

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## B. METHOD

### 1. *Subjects*

One hundred twenty-five undergraduates were selected from New York University to act as the experimental subjects. Sixty-two subjects were members of religious clubs: of these 17 were Catholic, 25 Jewish, and 20 Protestant. Sixty-three subjects were not members of religious clubs: of these 14 were Catholic, 42 Jewish, and 7 Protestant. Seventy-eight of the subjects were male and 47 were female; 120 of the subjects were white, four were Mongolian, and one was Negro.

### 2. *Procedure*

Each subject filled out a questionnaire that was designed to measure prejudice against Protestants, Catholics, and Jews. The questionnaire used in this study was adapted from a questionnaire devised and published by Levinson and Sanford (5) for measuring anti-semitism. There were 52 statements measuring attitudes about Jews in the original questionnaire. One statement was eliminated. The remaining 51 statements were randomly distributed in three groups with the limitation that an equal number of statements from each of the four sub-categories measured in the original questionnaire was included in each scale, to insure that the three scales would be equivalent. The average discriminatory power of the items in each scale was found to be 3.4. The wording of certain questionnaire items was then changed to include statements about Protestants and Catholics. For example, the first question originally said, "It would hurt the business of a large concern if it had too many Jewish employees." This statement was changed to "It would hurt the business of a large concern if it had too many Protestant employees." Thus Statements 1, 2, 7, 8, 9, 12, 14, 18, 19, 24, 27, 30, 34, 35, 36, 45, and 49 on the original scale were reworded so that they referred to Protestants. Statements 3, 4, 10, 11, 16, 20, 21, 25, 28, 29, 31, 39, 40, 41, 46, 47, and 50 were reworded so that they referred to Catholics. The remaining statements were left in their original form so that they referred to Jews. The split-half reliability of the Protestant, Catholic, and Jewish scales were found to be .76, .88, and .90, respectively.

## C. RESULTS

In testing the experimental hypotheses the .05 level of significance was adopted.

The first hypothesis concerned the effect of membership in a religious club on religious prejudice. The prejudice scores of members of religious clubs



were compared with those of students not belonging to any religious club by means of a *t*-test. The results of this analysis indicated that the prejudice scores of students belonging to religious organizations and students not members of religious organizations are not significantly different with respect to Protestants and Catholics. However, students belonging to religious clubs, regardless of their religious affiliation, were found to be significantly more anti-semitic than those not affiliated with religious groups.

The second hypothesis concerned the amount of prejudice directed against a given religious group by Catholics, Protestants, and Jews. The prejudice scores which each religious group obtained for the given group were compared by a series of *t*-tests. The results of this analysis indicated that members of each religious group directed significantly less prejudice against their own religious group than was directed against them by members of other religious groups.

The third hypothesis concerned the amount of prejudice felt by members of a given religious group toward their own and other religious groups. In order to test this hypothesis the three prejudice scores of each religious group were compared with each other by a series of *t*-tests. The results of this analysis indicated that (a) the religious groups studied are not more prejudiced against one religious out-group than another, i.e., Jews were not more prejudiced against Catholics than against Protestants, Catholics were not more prejudiced against Jews than against Protestants, etc.; (b) Catholics and Jews are less prejudiced against their own religious group than against other religious groups but Protestants are *not* less prejudiced against their own religious group than against other religious groups.

Correlations between the prejudice scores of a given religious group were calculated in order to evaluate the fourth hypothesis that religious prejudice represents a generalized attitude. An analysis of these correlations indicated that (a) all religious groups are quite consistent in the degree of prejudice which they direct against other groups. The average correlation was .81. (b) Protestants and Jews are reasonably consistent in the amount of prejudice which they direct against themselves and members of other religious groups. The average correlation was .69. (c) There is little relation between the degree of prejudice Catholics direct against themselves and the degree of prejudice they direct against other religious groups. The average correlation was .35.

## D. DISCUSSION

The findings related to the first two hypotheses were either as expected or replicated previous findings in the area and therefore need no particular comment. However the test of the third hypothesis indicated that Catholics and Jews preferred members of their own religious group more than they preferred members of other religious groups, whereas this was not true of Protestants. These findings, while unexpected, can be interpreted in terms of previous research in religious and racial prejudice. Gray and Thompson (4) asked white and Negro students to rate 24 ethnological groups found that Negro students rated all groups except their own lower than did white students. Lundberg and Dickson (6) tested high school students to evaluate the problem of selective association among ethnic groups and found that students representing American minorities displayed a greater in-group preference than did native white Americans. These studies suggest that persons who are victims of prejudice inflict on others what they themselves receive. This finding might help to interpret the fact that Protestants, who belong to the majority religion in the United States, displayed less in-group preference than did Catholics and Jews.

With regard to the fourth hypothesis, it was found that all religious groups were consistent in the degree of prejudice they directed toward other groups, tending to confirm this hypothesis. However, Catholics, in contrast to Protestants and Jews, displayed little consistency in the amount of prejudice which they directed against themselves as compared with the amount which they directed at other religious groups. This finding was unexpected and deserves further study.

## E. SUMMARY

A questionnaire designed to measure prejudice toward Catholics, Protestants, and Jews was administered to 125 undergraduates half of whom belonged to religious organizations and half of whom were non-members. Analysis of the data obtained from this questionnaire supported the following conclusions:

1. Students belonging to religious clubs are more anti-semitic than students who do not belong to such clubs.
2. Members of each religious group directed less prejudice against their own religious group than was directed against them by members of other religious groups.
3. Catholics and Jews are less prejudiced against their own religious

group than against other groups, whereas Protestants are not less prejudiced against their own religious group than against other religious groups.

4. All religious groups are consistent in the amount of prejudice which they direct against other religious groups.

5. Protestants and Jews are reasonably consistent in the amount of prejudice they direct against themselves and members of other groups, but there is little consistency between the amount of prejudice Catholics direct against themselves and against other religious groups.

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## THE SOCIAL DESIRABILITY VARIABLE IN ATTITUDE RESEARCH\*

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### A. INTRODUCTION AND PROBLEM

Recent research with objective tests of personality reveals that an assessment of traits, needs, and other variables of this type is frequently confounded by the factor of social desirability. Edwards (1) has shown that an S's need to describe himself in either a socially desirable or socially undesirable light is reflected in a wide variety of personality tests, independent of the particular content of the measuring instrument. In an effort to study this problem quantitatively, Edwards developed the Social Desirability Scale (SD scale). He has found that scores on this scale correlate substantially with many available paper and pencil tests of personality.

Attitude research which utilizes questionnaires, is dealing with a type of instrument similar in form to the paper and pencil test of personality. Yet little has been done to assess the distorting effects of the social desirability variable in studies where the criterion of attitude change is some change in response to a questionnaire after exposure to propaganda. It is the thesis of the present study that such alterations in response to attitude questionnaires are largely a function of S's general need to portray himself in either a socially desirable or a socially undesirable light.

In a typical propaganda study, Ss are characteristically divided into two groups, an experimental and a control group, with the experimental group receiving a particular propaganda appeal and the control group receiving no appeal or a different appeal. In the case of the before-after design, the effectiveness of the appeal is evaluated in terms of the changes in responses of the two groups to the two successive presentations of the attitude questionnaires. If the experimental group shows a significantly greater change than the control group, the investigator concludes that the propaganda appeal was successful in altering Ss' attitudes. It is just this type of conclusion which is questioned in this paper. Most propaganda appeals convey their message in terms which imply that it is socially desirable to change one's attitude in the recommended direction, and socially undesirable not to do so.

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An *S* may thus change his response in order to conform in the socially desirable direction or his change in response may reflect a basic change in underlying attitude. It is the failure to control for the former possibility which makes it difficult to evaluate the differential response of an experimental and a control group. Not only has one group been exposed to a propaganda appeal while the other has not, but one group has been exposed to standards of socially desirable behavior while the other has not. Without exploring the role of the social desirability factor, an investigator may be led into the error of *overestimating* the amount of attitude change which has taken place.

Some indirect evidence for this thesis is contained in the work of Janis (2, 3) on persuasibility. Janis was concerned with the general tendency of subjects to conform or not to conform to a series of propaganda appeals. He related this tendency to the type and degree of anxiety which a subject manifested. Janis found that persuasibility was related to his different measures of anxiety, but was forced to conclude after an inspection of his different anxiety scales, that: "Perhaps the fact that all three anxiety scales are positively inter-related reflects an additional personality component—willingness to admit to unpleasant feelings and personality weakness—that distorts somewhat the true picture of individual differences with respect to each of the separate anxiety scales" (3). In other words, the social desirability variable may account for a good portion of Janis' results on persuasibility.

However, evidence of this sort is at best suggestive and it is necessary, in evaluating the role of social desirability, to relate conformity to propaganda to some direct measure of social desirability. This is the basic purpose of the present study. It is hypothesized that scores on the *SD* scale will relate to the type of response shown to a propaganda appeal; *Ss* who conform to the propaganda will score higher on the *SD* scale than those who show no change, while both the conforming and unchanging groups will score higher on *SD* than the group which changes in a direction opposite to that recommended by the propaganda appeal. A monotonic relationship is predicted between scores on *SD* and responses to propaganda.

## B. METHOD

### 1. Subjects

The present experiment was run using the entire entering freshman class at a medium-sized high school in the state of Washington. All materials were presented in the *Ss'* health education class and were conducted as part of the regular health education curriculum.

## 2. *Administration of SD Scale*

The 39-item *SD* scale was administered to *Ss* in their regular class hour one week prior to the exposure to the propaganda materials.

## 3. *Propaganda Materials*

The propaganda materials were part of another study investigating individual differences in response to fear-arousing propaganda. There were two appeals, a strong fear appeal and a minimal fear appeal, dealing with the general topic of dental hygiene. The talks, which differed in terms of the number of threat references and the nature of the accompanying slides, were presented on tape with coordinated slide presentations. Using a simple alternation procedure, classes were assigned to either a strong fear or a minimal fear group. All talks were presented during the course of a single day. The talks and the slides are identical with those used by Moltz and Thistlethwaite (4) in an earlier study.

## 4. *Procedure*

In an effort to evaluate the effectiveness of the propaganda, a before-after design was used. Each *S* was asked to fill out a pre-test questionnaire two weeks prior to exposure to the appeals and asked to fill out another post-test questionnaire two weeks after exposure to the appeal. The two questionnaires differed markedly in terms of the nature of the filler items, the format and even the color of the paper in an effort to mask the purpose of the study. However, common to both questionnaires was a five-item dental practices scale, dealing with those toothbrushing habits which the appeals hoped to alter. Conformity was evaluated in terms of the *Ss'* changes in responses to this five-item scale. *Ss* were grouped according to the following classification: (a) Positive conformity. Increase in the number of recommended practices after appeal. (b) No change. No change in the number of recommended practices after appeal. (c) Negative conformity. A decrease in the number of recommended practices after appeal.

## C. RESULTS

The basic hypothesis of this study was tested by comparing the *SD* scale scores of the three conformity groups. Since significant sex differences have been noted on the *SD* scale, the comparisons were done separately for males and females. As a further precaution against a possible differential effect between the propaganda appeals, the analysis was broken down according to lecture type. The results of the analysis as well as the tests of significance are presented in Table 1.



TABLE 1  
SD SCALE SCORES BY SEX, LECTURE TYPE, AND TYPE ON CONFORMITY

	N	Mean	SD	Comparison	t	p
STRONG FEAR APPEAL						
<i>Males</i>						
Positive	28	26.75	6.56	Pos. vs. no	0.075	NS
No change	32	26.88	6.79	no vs. neg.	2.280	< .05
Negative	19	22.89	4.42	pos. vs. neg.	2.244	< .05
<i>Females</i>						
Positive	33	22.03	5.77	Pos. vs. no	0.270	NS
No change	19	21.53	7.20	no vs. neg.	0.194	NS
Negative	17	21.94	4.95	pos. vs. neg.	0.055	NS
MINIMAL FEAR APPEAL						
<i>Males</i>						
Positive	23	24.83	7.17	Pos. vs. no	0.449	NS
No change	20	25.80	7.17	no vs. neg.	0.034	NS
Negative	9	26.56	4.70	pos. vs. neg.	0.670	NS
<i>Females</i>						
Positive	32	24.38	4.84	Pos. vs. no	1.877	NS
No change	31	22.19	5.10	no vs. neg.	2.550	< .05
Negative	9	27.22	5.63	pos. vs. neg.	1.500	NS

It can be seen in Table 1 that the simple relationship between *SD* and conformity is not upheld. There are two distinct trends apparent in the data which point to a rather complex interaction between *SD*, sex of *S*, and type of propaganda appeal. For the *Ss* who received the strong fear appeal the predicted trend of higher scores on *SD* being associated with greater conformity is observed, but it is a statistically significant trend only for males. The reliable differences which are obtained for males do not support the idea that the positive conformity and no change groups have different standards of social desirability; it is the negative conformity group which deviates significantly from the other two groups.

In the case of the minimal fear appeal, a trend opposite to the one predicted is obtained. Increases in conformity are associated with lower, rather than higher scores on *SD*. This trend is only statistically significant within the female group and suggests once again that it is the negative conformity group which stands apart.

#### D. DISCUSSION

It was predicted that changes in response to successive presentations of questionnaires would bear a simple relationship to social desirability. The present results indicate that these changes in response are a complex function of *SD*, sex of subject, and type of propaganda appeal. Although *SD* does

appear to be a factor in response change, the complexity of the relationship makes it extremely difficult to estimate in advance the type of effect which *SD* will have. This fact highlights the necessity for controlling this variable in attitude research. Two methods, developed for controlling *SD* on personality inventories, seem to be applicable to attitude questionnaires. The first technique involves the use of a forced-choice questionnaire. Instead of presenting *S* with a series of single items, attitude questionnaires can be constructed in which *S* must choose between pairs of items matched for their social desirability value. *S*'s task would be to choose the one item of the pair with which he agrees or disagrees. By pairing one item relevant to the propaganda with another completely unrelated to it, *S*s can describe themselves in a socially desirable or socially undesirable light while showing no basic change in attitude.

The second method involves the use of an empirical correction factor, analogous to the *K* correction in the M.M.P.I. Scores on a test similar to the *SD* scale might be used to correct the observed changes in questionnaire responses after exposure to a propaganda appeal.

The present study indicates that the role of *SD* is a function of the type of propaganda appeal. With the strong fear appeal, *decreasing* scores on *SD* are paralleled by *decreasing* conformity. With the minimal fear appeal, *decreasing* scores on *SD* are paralleled by *increasing* conformity. This suggests that there is some essential difference between the two appeals which affects a subject's tendency to describe himself in a socially desirable or socially undesirable light. An examination of the two appeals reveals that they set the standard for socially desirable behavior in different ways. The strong fear appeal relies heavily upon personal threat references and states that dire consequences will follow non-conformity to its recommendations. The minimal appeal is highly impersonal in its presentation and relies upon a rational appeal to the audience. There is little or no mention of serious consequences following failure to conform to its message. It may be that scores on *SD* reflect individual differences in the need to rely upon external authority for approval. When a propaganda appeal implies the existence of some external rewarding authority, acceptance or non-acceptance of its recommendations might depend upon *S*'s need for such reward from external authority. However, when a propaganda appeal implies that the choice of response is largely up to the individual *S*, conformity would be based on an opposite tendency—the need to rely *primarily* on internally derived standards of right and wrong behavior. The manner in which an appeal presents a standard of socially desirable behavior may be a relevant factor in how *SD*

affects changes in questionnaire responses. Further research using propaganda appeals with varying methods of stating their recommendations is necessary in determining the exact nature of the interaction between *SD* and form of appeal.

#### E. SUMMARY

This study attempted to investigate the role of social desirability in attitude research. It was hypothesized that changes in questionnaire responses reflect *S*'s need to describe himself in a socially desirable or socially undesirable light, rather than any basic change in attitude. Specifically, it was predicted that type of conformity to propaganda would be a simple function of scores on the *SD* scale.

The *SD* scale was administered one week prior to exposure to a propaganda appeal. *Ss* received one of two appeals, a strong fear appeal and a minimal fear appeal. Conformity was evaluated by changes in response to a dental practices scale.

The results indicate that scores on the *SD* scale do relate to conformity, but as a complex function of sex of subject and type of propaganda appeal. It was suggested that the manner in which a propaganda appeal presents its standards of socially desirable behavior may be the relevant factor which interacts with *SD*.

The suggestion is made that future attitude studies should control for *SD* and methods for so doing are presented.

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## STATUS STRATIFICATION AND STATUS EQUALIZATION\*

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### A. INTRODUCTION

Judgments of status seem to be a function of at least four different variables which affect the standards according to which the judgments are made. These variables are: (a) the choice of reference group (5, 8), (b) the difference in status between the judge and the group being judged (9), (c) the status characteristics according to which persons and groups are being stratified (15), and (d) the attitude of the judge toward status (10). Most studies of status which use multiple standards report shifts in the amount of judged status. Few studies, however, report the relationship between standards of judgments and the degree of stratification, independent of the assigned status.

Under certain circumstances, status stratification, and the opposite thereof, status equalization, can be viewed as ideological to the individual. For example, one individual rates a set of occupations according to their status as to where he himself thinks they *ought* to be, and the individual makes little or no status differentiations among these occupations, even though he made large differentiations when asked to stratify the same occupations according to where he thought the "general public" would rate them. In such a case one is dealing with the individual's ideological conception of status which is contrary to his image of his society.

Two contrasting theoretical viewpoints suggest themselves with respect to the ideology of status stratification. Basic to one point of view is the assumption that individuals who rigidly stratify according to one criterion, e.g., occupational group membership, will also make more rigid status differentiations among social groups which differ in other social psychological characteristics, e.g., socio-economic power, ethnic and minority group membership, etc. In other words, the above point of view states that the ideology of status stratification is generalized. In this point of view the similarity between the ideology of status stratification and the ideology of authoritarianism becomes

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<sup>1</sup> This report is based upon a study of status and job satisfaction among professionals in the State of Ohio. The authors wish to express their gratitude to Dr. A. Scodel for his critical comments on this study.

apparent. The authors of *The Authoritarian Personality* state that one of the differentiating patterns in the politico-economic ideology of the high and low authoritarians is "the emphasis . . . on a static, rigid stratification of groups. . . ." by the antidemocratic or authoritarian personality (1, p. 151).

If the rigid status stratifier is antidemocratic in his ideology, it would follow that he is less often a member of a minority group, and that he attaches great importance to status and prestige and relatively less importance to freedom. It would also follow that the rigid stratifier is characterized by a less accurate social perception, as found in studies relating authoritarianism to social perception (13, 14).<sup>2</sup>

In the second point of view the supposition that the ideology of status stratification is generalized is rejected. According to the second point of view certain types of stratification are fundamental to any type of social organization; and the American democratic system accepts some criteria for stratification, such as socio-economic power, occupation, training, and education, and rejects others, such as ethnic or minority group membership.<sup>3</sup> The second point of view implies that rigid status stratification based on occupational group membership is part of the American social system and that it is more realistic than no occupational status stratification. From this it would follow that, contrary to the previously stated conjectures, the status stratifier is more in conformance with democratic ideology and hence attaches greater importance to freedom, and has a more realistic social perception. From this point of view it would also follow that self-perceived status, socio-economic status, ethnic or minority group membership, and the importance attached to status, are unrelated to the ideology of status stratification.

The purpose of this study is to determine some of the differentiating social psychological characteristics of stratifiers and equalizers of occupational

<sup>2</sup> Dr. Scodel suggested a somewhat different interpretation. He stated: "One would expect more generality in authoritarians and more differentiation in non-authoritarians. To take an example, authoritarians who attribute high occupational status to one group might also accord them more status in a purely social situation whereas the non-authoritarians would differentiate between the two situations. And, obviously, more differentiations of this sort should be correlated with more accurate social perception and a wish for more freedom" (from personal communication). Here, the generality lies in the perception of status across situations rather than in status stratification across criteria.

<sup>3</sup> For a distinction between status criteria based on inheritance and criteria based on competition see (3). Says Cooley: "While the former is a low principle, the latter is also, in many of its phases, objectionable, involving waste of energy and apt to degenerate into anarchy. There are always difficulties on either hand, and the actual organization of life is ever a compromise between the aspirations toward freedom and the convenience of status" (p. 339).



(professional) status. The status stratifiers and status equalizers are compared with respect to their ethnic and minority group membership, their self-perceived status, their socio-economic status, and with respect to the importance they attach to status and to freedom. The two groups are also contrasted in their accuracy of social perception, by comparing their estimates of their own expected status from various reference groups and the status actually received from these reference groups.

## B. METHOD

The data are based on standardized individual interviews with 400 individuals, representing five different professions, each divided into state employed and non-state employed. The professions represented were psychiatry, psychology, social work, teaching, and nursing. The state employed were selected from six different state hospitals and schools; the non-state professionals came from 27 different clinics, agencies, general hospitals, public schools, and from private practice. There were 40 professionals in each sub-sample.

During the interviews each individual was asked to rate 22 professional specialties according to their status, as he thought the "general public" would rate them. Among the specialties rated were the five professions comprising the sample. Each interviewee was then asked to re-rate the status of the five professions comprising the sample, each one separately, as he himself thought their status *ought* to be.

The intra-individual standard deviation of the last five ratings was used as an index of stratification of an individual. The stratification score ranged from 0 to 31. Some of the individuals were then placed into a stratification or equalization category, using two separate criteria. The first criterion was the degree of extremity of the distribution of the stratification score. All individuals below one standard deviation below the mean fell into the equalization category, while all individuals above one standard deviation above the mean fell into the stratification category. To make the stratification score of the equalizers independent of their stratification score with the "general public" as reference group, an F-test of the variance of the latter judgments over the former judgments was computed for each individual, and only those persons whose ideal stratification score was significantly smaller ( $p < .05$ ) were kept in the equalization category. None of the persons falling into the stratification category had a variance which differed significantly from their variance of the judgments based on the "general



public."<sup>4</sup> Using these criteria, the investigators had two groups, a group of sixty-one status equalizers, and a group of sixty-one status stratifiers.

The interviewees had been asked to state the degree of status they expected to receive from each of the five professions comprising the sample. These judgments are compared to the degree of status actually received from the five professions, and the discrepancy between the two represent the degree of status overestimation. The degree of status over- and underestimation was obtained by computing the discrepancy between the status expected from a reference group and the status actually assigned by that reference group. Since five different professions were used as reference groups, the status bias score of an individual is the mean of five different discrepancy scores (6).

The interviewees had also been asked to rate eight variables of job satisfaction with respect to their importance. Among these were the variables of "status and prestige," and "freedom." All of the above ratings were obtained by means of the magnetic board rating technique. All variables to be rated are attached to small magnets, which are placed by the interviewees on a scale ranging from 0 to 100, attached to a light steel board. The average test-retest reliability of the technique is .99 using mean judgments and .92 using individual judgments. For detailed information about the technique see (2, 7). Finally, all interviewees filled out a questionnaire pertaining to various objective indices of status such as age, sex, income, etc. There were 21 indices of objective status. These include ethnic group memberships (11).

### C. RESULTS

The status stratifiers and equalizers are compared in their (a) objective status, that is income, age, and a weighted total objective status score; (b) their minority group membership such as sex, race, and religion; (c) their self-perceived status;<sup>5</sup> (d) the relative importance they attach to status and prestige, and to freedom; and (e) the degree to which they overestimate their own status. The last judgment is used as an index of accuracy of social perception, since it is based upon the discrepancies between subjective estimates and independent criteria. All of the data in the last three categories are

<sup>4</sup> Actually the variances of both types of judgments should have been based on ratings of the five professions only. This, however, was not possible, since the ratings of the five professions were not independent from the ratings of the other 17 professions, when the "general public" was used as reference group. Also since the variance of the latter ratings was based on 22 professions, ranging from hospital attendant to United States Supreme Court Justice, it could not be significantly less than the variance of the five ratings of ideal status, as would have been desirable for the stratifiers.

<sup>5</sup> For this judgment the reference group was the "general public."

controlled for response set, since it was found that the stratifiers and equalizers differed significantly in their response sets. Response set refers to the tendency of an individual who responds in a certain manner to one variable, to respond in the same manner to all variables irrespective of the type of variable. Thus, for example, individuals who overestimated their own status tended to rate all of the 22 professions, all 8 factors of job satisfaction, as well as their own job satisfaction higher than the individuals who underestimated their status. The control of response set was applied in the following manner: the mean over- or underrating tendency of an individual across all of his subjective judgments was computed by taking his deviation from the mean judgment of the entire sample, for each variable. These deviations were added and divided by the number of variables. This resulted in a numerical index indicating the average tendency of an individual to over- or underrate all variables. All of the individual's judgments were then corrected by adding or subtracting the index from his response (4, 12).

Table 1 presents the frequency distribution of the status stratifiers and equalizers according to sex and race. As can be observed neither of the two distributions reaches statistical significance, although more females and somewhat more Negroes are found in the equalizer group.

TABLE 1  
FREQUENCY OF STRATIFIERS AND EQUALIZERS ACCORDING TO SEX AND RACE

	Female	Negro
Stratifiers (N = 61)	31	5
Equalizers (N = 61)	41	9
	3.388	1.291
$\chi^2 = (1 \text{ d.f.})$		

In Table 2 the two groups are broken down according to religious affiliation. Again, the observed differences do not reach statistical significance. The Protestant group, however, is the only one which has a higher frequency in

TABLE 2  
FREQUENCY OF STRATIFIERS AND EQUALIZERS ACCORDING TO RELIGION

Religion	Stratifiers	Equalizers
Protestants	33	40
Non-Protestants	28	21
a. Catholic	11	9
b. Jewish	9	7
c. Other	8	5
$\chi^2 = 1.812 \text{ at } 3 \text{ d.f.}$		

TABLE 3  
MEANS AND DIFFERENCES IN OBJECTIVE STATUS, IMPORTANCE OF STATUS AND PRESTIGE, AND FREEDOM, SELF-PERCEIVED STATUS,  
AND STATUS OVERESTIMATION BETWEEN STRATIFIERS AND EQUALIZERS

		Income†	Age†	Objective Status (Total score)	Importance of Status and Prestige	Importance of Freedom	Self- perceived status	Status Over- estimation
Stratifiers ( <i>N</i> = 61)	$\bar{x}$	5.8	3.2	24.6	63.8	88.2	58.6	11.8
	<i>s</i>	3.02	1.01	12.60	27.01	15.99	17.10	17.90
Equalizers ( <i>N</i> = 61)	$\bar{x}$	5.6	3.4	23.6	64.3	81.8	58.4	17.6
	<i>s</i>	3.02	1.09	13.39	22.57	11.98	15.60	14.01
	<i>t</i>	.387	.336	.403	.124	2.493*	.073	1.989*

\*  $P \leq .05$ .

† Age and income in categories.



the equalization category, while the Catholic, Jewish, and other groups have a higher incidence of stratifiers.

Table 3 indicates the means and differences of means of objective status, importance of status and prestige, importance of freedom, self-perceived status, and status overestimation of the two groups. The only significant differences occur with respect to the importance attached to freedom and the degree of status overestimation. The status stratifiers attach significantly greater importance to freedom and have a more accurate perception of their own status.

#### D. DISCUSSION

Two contrasting theoretical viewpoints were postulated with respect to the ideology of status stratification. One point of view states that the ideology of status stratification is generalized and is related to authoritarianism. The other point of view rejects the generality of the ideology of the status stratifier, and accepts status stratification which is based on occupational group membership as basic to the American social system.

Although this study did not test the generality of stratification ideology directly, the results seem to support the second interpretation. However, it should be remembered that the generality of the ideology of status stratification and equalization was obtained from judgments about five related professions. While the possibility exists that the different ideologies are purely a function of these specific professions, the authors make the assumption that the obtained differences reflect a broader ideology of occupational status stratification, since the judgments actually encompass 10 different professional specialties. That is, for the state employed samples, the judgments pertained to the other four professions in the same occupational setting and the "opposite partner,"<sup>6</sup> while for the non-state employed professions and the "opposite partner."

The status stratifier attaches significantly greater importance to freedom, and he is more accurate in his social perception, at least as far as his own status is concerned. There were no significant differences in self-perceived status, socio-economic status, and in the attitude toward status and prestige between the status stratifiers and equalizers. There were also no significant differences in professional and ethnic and minority group membership. However, it is interesting to note that the one religious group which had a higher incidence of status equalizers were the Protestants, a majority group. Could

<sup>6</sup> By "opposite partner" is meant here persons of the same profession as the judge, but in the other occupational setting (state or non-state employed).

it be that the "protestant ethic" minimizes organizational qualities such as status differentials, while "social ethic" attempts to maintain and possibly to increase it? If, as Whyte argues, the Protestant ethic becomes more and more divergent from reality (16, p. 19), this might explain the less accurate (less realistic) social perception of the status equalizers.

In the final analysis, then, the ideology of the status stratifier is in agreement with, and conforms to his image of society, while the ideology of the equalizer is in conflict with, and non-conforming to his perception of society. If this be the case one would expect the status equalizers to carry more conviction in their ideology, since they believe themselves to be going against public opinion. This deeper conviction would probably express itself in a greater generality in their belief. The authors therefore suggest that the generality of the ideology of status stratification and equalization be tested directly, with the hypothesis that the status equalizers will show greater generality.

While the influence of equalitarian ideology may be insignificant when compared to the ideology of status stratification in America society, its importance should not be underemphasized. It is the equalitarian ideology which perhaps serves more to maintain "interpersonal relations between persons of different stations in the stratification scale" (17), especially within the same occupational and organizational setting.

#### E. SUMMARY

The purpose of this investigation is to study and compare some of the social psychological characteristics of persons who ideologically stratify occupations and those that do not make such status differentiations. Two contrasting theoretical assumptions are utilized in predicting such characteristics. The first assumption comes from the California Study of the Authoritarian Personality which states that the rigid stratifier is anti-democratic. The second framework maintains that occupational stratification is fundamental to the American social system and that therefore the stratifier is democratic in his ideology.

The data come from a study of status and prestige of professional persons. Four hundred professional persons were seen in standardized individual interviews during which they were asked to stratify a set of professional specialties according to the "general public" and again according to where the interviewees thought they ought to be. The intra-individual standard deviation of the last judgment was used as an index of stratification of an individual. The interviewees were then asked to rate the status they them-



selves expected to receive from other professions. They were also asked to rate the importance they attach to eight variables of job satisfaction. All of these ratings were secured with the magnetic board rating technique. Finally all interviewees filled out a questionnaire pertaining to various objectively measurable indices of status, such as age, sex, race, income, etc.

The results indicate that the high stratifiers attach significantly greater importance to freedom and overestimate their own status significantly less than the status equalizers. There were no significant differences in minority group membership and objective status between the two groups. These findings support the assumption that the occupational status stratifier in American society is democratic in his ideology.

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## PERCEPTUAL DISTORTION AS A FUNCTION OF THE VALENCE OF PERCEIVED OBJECT\*

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### A. INTRODUCTION

It has been demonstrated in numerous experiments that cognition moves in the direction of needs (1, 2, 4). In a recent experiment Jones and de Charmes (8) have shown that different inferences are drawn from the same behavior when the behavior does or does not have the same relevance for the perceiver. They observed that the perception of others' characteristics varies greatly as a function of whether others' behavior promotes or interferes with goal attainment or the maintenance of values. Likewise, Wittreich (13), in a study of married couples and strangers, noticed that the spouse was perceived as less distorted when viewed through aniseikonic lenses than a stranger. In another study (14) the same author reports his subjects observing much less distortion in self image in mirror than in a stranger.

Such observations provide some evidence in support of the learning theory according to which past experiences, purposes, significances, and values have an automatic effect upon the perception of objects (9). This hypothesis, Engel suggests, runs contrary to Köhler's theory (10) that sensory organization is prior to and independent of experience, and that entities and shapes acquire meaning subsequently (7). However, it seems that the foregoing studies focus too sharply the antithesis between Gestalt and learning theories. That primitive sensory phenomena are "organizational" has been amply demonstrated. This hypothesis does not appear to run contrary to the observation that figural aspects may be more or less distorted by the perceiver. It seems that this apparent contradiction may be best resolved in terms of the Lewinian model.

### B. PROBLEM

The paper reports the findings of a preliminary experiment designed to investigate the influence of valence of objects on their perception. Our habit

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of looking at things, our past experience, set, and context render the observation of the role of valence of objects in perceiving difficult. If, therefore, the perceptual conditions could be altered and differently valenced objects presented for perceiving, it may be possible to study the role of valence of objects in perceptual activity.

### C. METHOD

#### 1. *Apparatus*

The *O*s were required to wear an aniseikonic glass or size lenses. The aniseikonic lenses project sharply defined dioptric image patterns of various types on retina. The images are altered from the normal images in size and shape by known amounts. Thus altered conditions of perception were artificially and temporarily induced. The two retinal images, though different, fuse giving distorted perception of things.

#### 2. *Objects*

Five types of objects were viewed by *O*s when wearing the lenses: (*a*) a positively valenced person, namely a friend; (*b*) a negatively valenced person, namely a hated or disliked person. These two social objects were chosen by each observer about five months ahead of the experiment. In some cases where it was difficult to select a disliked person, the least liked was put in this category; (*c*) a stranger representing a social object with neutral valence; (*d*) physical objects in a regular class room; and (*e*) self image in a full length mirror, which is supposed to be positively valenced except in cases of depression when it would acquire a negative valence. The selection of objects permitted the use of some features of Brunswik's representative design, namely the sampling of objects (3).

#### 3. *Conditions of Experiment*

Each *O* was taken into a regular class room where the lenses were put on. The *O* was asked to report freely his visual experience. A rest period of about 10 minutes was allowed to elapse between two sets of observations so that normal vision might be restored. The lenses were then reversed, the lens over the right eye was now over the left eye, and vice versa. The two conditions of observation were designed as I and II. Observations made under one condition were checked with those made under the second. To eliminate the effect of previous experience with the lenses on the observation of successive objects, the order of presentation of the five objects was rotated. Observations were recorded after approximately maximum adaptation was obtained when wearing the lenses. The time required for adaptation varied

with different *Os*. *Os* were requested to report their observations freely but care was taken to obtain the required information by asking questions whenever necessary.

#### 4. Sample

Twenty university students of normal eyesight and of both sexes participated as *Os*. For each *O* five objects of perception had to be separately determined. *Os* were ignorant of the purpose of the experiment.

#### D. RESULTS

All *Os* reported seeing distortion under both the conditions I and II. The latency time, that is the time elapsing between wearing the lenses and the appearance of distortion for various *Os*, was measured in seconds.

TABLE 1  
SHOWING THE MEAN LATENCY TIME FOR VARIOUS OBJECTS (IN SECONDS)

Perceived objects	A	B	C	D	E
Mean time (seconds)	43.06	21.00	29.72	23.61	49.39

Analysis of variance showed no significant difference between various objects. One reason may be that the disliked and least liked were put under the same category. Rank ordering of the data however suggests that distortion takes place in the following sequence: (earliest) disliked person, inanimate object, stranger, liked person, and self image. The disliked person, stranger, and self image generally showed an increase in size, the liked person and the inanimate objects, a decrease in size. All social objects appeared more often to lean backwards rather than slope, bend, or slant. The upper clothing showed a tendency to slope. In regard to dress, the amount of distortion was measured by asking *Os* to rate their distortion for various objects was measured by asking *Os* to rate their distortion experience on a five-point subjective rating scale. Rank ordering of objects in order to decreasing amount of distortion yielded the following sequence: (maximum distortion) inanimate objects, disliked person, stranger, liked person, and self image (least distortion). Differences in regard to reference to details were also noted. Social objects ranked in terms of frequency with which various body parts were seen distorted as follows: (largest reference to details undergoing distortion) disliked person, liked person, stranger, and self image (least reference).

A qualitative analysis of the language used by *Os* to describe the changes in perception showed that the liked person was more often described as



"looking handsome," of "beautiful complexion," "smiling like a girl." The disliked person appeared "boy-like," with "boy-like nose," "face looking ugly," "eyes pushing in"; the person looked "tiny and ugly," "flat and ugly," stomach "bulging out," and fingers "grown thin." The pyjamas appeared "very tiny" and shoes looked like those of "children." In self image a thin, lean *O* described his cheeks as "looking inflated."

### E. DISCUSSION

Despite the limitations of the present investigation, it is significant that the results of independent and differently designed experiments show consistency. Many of the findings of Wittreich are verified (13, 14). The present experiment also used an inanimate object. It was interesting to note that the inanimate object produced the greatest amount of distortion compared to all other social objects. This observation seems to run contrary to the general belief that it is more difficult to distort physical reality than social objects. One reason may be that unlike physical objects, persons, including the negatively valenced ones, have their own purposes which can and do interact with the purposes of the perceiver.

The extent of distortion and the rapidity with which it developed seem to be related. In case of social objects the speed of distortion was found to be inversely proportional to the amount of distortion. That is, distortion took place earliest in objects which showed the greatest degree of change. Rank ordering of objects for the degree of distortion and for extent of reference to details undergoing change was nearly the same but for the position of the neutral social object.

In an experiment on naval recruits, Wittreich found that authority figures showed less distortion than non-authority figures when they were viewed through aniseikonic glasses. It was remarkable, Cantril suggests, that a rigid acceptance of roles produced a "constancy" which overpowered the physiological changes in optical system (4). Some casual observations made in connection with the present experiment showed that many students failed to see any distortion developing in some of their instructors. And further, that the amount of distortion and the latency time appeared to vary with the authority levels of the viewed persons. The authority level, however, seemed to be defined not by the official status of the instructors but in terms of the personal relationships or the "significance" those social objects had for the perceiver. Distortion set in and quickly, too, in instructors who appeared "near" to the perceiver. This observation again seems to suggest that there

is an interaction of the purposes of the perceiver and the perceived individual in cognitive activity.

While these preliminary findings need further confirmation and more rigorous testing, the present findings further substantiate the view that perception is something more than a mere function of the perceiving mechanism or the stimulus structure. Sensory phenomena are organized and they acquire meaning in the field in which they occur. Lewin seems to have appropriately appraised the situation in his concept of valence. The valence of perceived object, according to him, is a field function. Perceptual activity is one form of behavior which is largely governed by the valence of the perceived object. Valence is not a property of the needs, motives, purposes, and values of the perceiver exclusively. It is a function of the entire field whose contemporaneous structure is simultaneously a product of the present sensory matrix, past experience, and future expectations. It is no doubt true that the behavioral field (including the perceptual) is fashioned considerably, as the clinicians, projectivists, and dynamicists (12) have shown, by the perceiver's needs, expectations, and values. The transactionalists too seem to sympathize with this view when they conceive of the individual as "creating" his self- and social-constancies in terms of his purposes, expectancies, meanings, and significances that one attributes to objects and persons (4).

It is true that one's transactions are "not merely reactions to an environment whose various aspects have some static and God-given attributes" which our brain registers. It also seems true that the significances and meanings that one attributes to perceived entities are what one brings to a situation and what he "makes of it." The reality world becomes personal: "it is *his* and his alone." And yet the transactionalist feels that "it is no modern version of solipsism" (5). Solipsism is sought to be evaded by saying that we have shared similar experiences and similar purposes. Each monad though 'windowless' is nevertheless "a mirror of the whole world." The experiences and values of a culture are shared, they are not exclusively the perceiver's. As biological systems, *homo sapiens* are entitled to similar experiences. The perceptual world ceases to be utterly personal. Values, logical environment is not entirely the individual's own fabrication. Values, meanings, purposes, and significances are a crystallization of socially shared values which are the products of social interaction in a given culture. The results of Professor Allport's experiments with stereoscope on South Africans in which the prejudiced groups perceive the hostile group members in a distorted fashion have been interpreted as due to the operation of the perceiver's purposes, his needs and prejudices (4). May it not be that the



entire psychological environment (that is, the highly charged racial tension in that country) or the social context prejudices the members of one community to perceive members of hostile community in an unfavorable light. It is the field property, the hate or prejudice prevailing in a group, rather than an individual's own needs and purposes which invest the perceived object (a Zulu or an Indian) with a negative valence. The perceived objects (members of out-group) develop negative valence by virtue of the hostile feelings between communities. It seems then that perceptual distortion is a function of the valence which an object acquires from the field structure in which it exists. Viewed in this manner the antithesis between Gestalt and learning theories would seem to be more apparent than real. The primitive sensory organization is one level experience, the acquisition of meaning another. The phenomenon of organization would simply enhance the degree to which objects acquire meaning. Lewin's hypothetical construct of valence appears to be well suited for a phenomenological description of distortions developing in perception.

#### F. SUMMARY

The influence of valence of objects on their perception was experimentally studied by using aniseikonic lenses. Results obtained confirmed some of the earlier findings. Other conclusions were that the speed of perceptual distortion appeared inversely proportional to the extent of distortion and that contrary to general belief, physical objects were more readily distorted than social objects. The last finding and some evidence from the perception of authority figures seemed to throw light on the problem of interaction of purposes in perception. Theoretically, it was suggested that the apparent antithesis between Gestalt and learning theories could best be resolved in terms of the Lewinian model.

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## LEADERSHIP AND FRIENDSHIP STATUS AS FACTORS IN DISCUSSION GROUP INTERACTION\*

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### A. PROBLEM

The purpose of this study is to examine the relationships between a quantitative index of verbal interaction among the members of a discussion group and indices of sociometric choice on friendship and leadership criteria.

In a recent series of investigations, the authors and their colleagues have been concerned with problems of communicating information concerning mental health to various types of community groups. Several factors that play a role in the persuasion process have been reported, among them certain biographical characteristics of the group members (5), attitudinal composition of the target groups (7), and the use of group discussion following single and multiple communications (6). McGinnies and Vaughan (5), for example, found that participants in group discussion are generally distinguished by superior educational attainment as well as by leadership status in their respective groups. While yielding information concerning the types of individuals who might be expected to dominate discussion, this type of analysis did not reveal the patterns of interaction that occur among these individuals. It seemed probable that the sociometric structure of discussion groups would be a factor determining the direction of participation once the active participants had been recruited. Choices based upon leadership within the group as well as personal contact among the group members seemed to be the most relevant for this purpose.

The leadership variable in discussion behavior has received some attention by other investigators. Bell and French (1) report that the leadership standing of most of the members of informal discussion groups was unaffected by changes in either the composition of the group or the topic of discussion. Studying the effects of status upon interpersonal choice and communications within small discussion groups, Hurwitz, Zander, and Hymovitch (3) found

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that high status individuals communicated more than those low in status. Both low and high status persons directed more of their remarks to members high in status, so that high status individuals both initiated and received more communications than did lows. Friendship as a confounding variable was eliminated by selecting individuals having no previous acquaintance with one another.

In actual practice, however, stable patterns of both leadership and friendship are likely to exist within a formed group prior to any experience that the group may have with a persuasive communication. Several interesting questions then arise. Are friendship and leadership standings of the members correlated? If so, do those individuals enjoying high status with respect to these variables also initiate and receive most of the verbal exchanges in group discussion? The findings of Hurwitz and his associates suggest that this would be the case, although their study did not utilize pre-existing friendship relations or actual choices within the group as measures of leadership. If friendship and leadership are not related to a significant extent, which of these factors is a more reliable determinant of initiative in discussion? A review of the literature on small group discussion discloses no answer to these questions and confirms what Lindzey and Borgatta (2) have referred to as the relative paucity of "... research aimed at exploring in a regular fashion the kinds of conditions and variables that are related to sociometric response."

## B. PROCEDURE

Two community groups from suburban Washington participated in the investigation. Both discussion groups were drawn from larger PTA organizations, and the members were generally acquainted with one another. Friendship and leadership status in all probability, were substantially determined at the outset of the experiment. One group (*A*) was composed of 18 women organized as a child study group, while the other (*B*) consisted of two male and 16 female members. All of the women in both groups gave their occupation as housewife, and the averages for the two groups were 38.6 and 33.4 years. The mean numbers of years in college were 3.3 and 2.0 for the two groups, while the average yearly income was \$9,100 for the first group and \$5,700 for the second. One group, therefore, was somewhat older, enjoyed slightly more education, and was higher salaried than the other. These differences, however, were not marked. Each group met at their usual location for three experimental sessions spaced at weekly intervals. During each meeting groups viewed a film portraying a mental health problem, discussed the film for a period limited to 30 minutes, then responded



to a questionnaire. Three films, *The Feeling of Rejection*, *The Feeling of Hostility*, and *Breakdown*, were shown to each group in that order.

With the knowledge and consent of the participating groups, each discussion was tape-recorded so as to provide a verbatim account of the groups' verbal activity. Furthermore, to identify the discussion contribution of each individual member of the group, two experimenters maintained a record of the direction of verbal activity throughout the discussion identifying the initiator and recipient of each comment according to their location in the room, i.e., by row and letter seat number, as described in detail elsewhere (4).

A verbatim transcript was prepared from the tape recording of each discussion, and the sequence of comments was matched with the sequence of commentators. Through this technique every comment in the discussion was identified by source and destination. Although comments were always initiated by an individual, the recipient might have been the leader, the group as a whole, or another member.

Biographical information was obtained from the groups on the occasion of their first meeting, and sociometric data were collected at the second and third meetings. Each questionnaire was coded according to the row letter and seat number of the respondent. Questionnaire responses were thus easily matched with the individual's verbal activity during the discussion.

Following the discussion period of the second meeting, each person was asked to indicate the two members of the group with whom she considered herself to be most friendly. The subjects made their choices by means of a diagram representing the group's seating arrangement. As a row letter and seat number combination identified the location of each individual in the group, the subjects needed only to circle that combination which spatially located each friend. This procedure was necessitated by our original assurance of anonymity in connection with the tape recordings.

At the third and final meeting, each person was asked to identify those members of the group whom she would choose for president and vice-president if the group were to continue and to require officers. These data were gathered by the same technique used to obtain friendship preferences within the group; the subjects made their choices by indicating the row and seat combination corresponding to the location of their nominations.

### 1. *Indices Developed*

Three values were calculated for each member of the two groups.

a. *Friendship status.* Total choices received from all other members of the group constituted the friendship score of each member. The individuals

were then ranked in order of frequency of choices received on this criterion, and the ranks served as measures of friendship status.

*b. Leadership status.* The total of the nominations received for either president or vice-president from all other members of the group yielded a leadership score for each person. The members of each group were then ranked according to these scores, with a high rank indicating greater leadership status.

*c. Interaction status.* An index was sought to describe the degree to which each member of the two discussion groups verbally interacted with her fellow members during the discussions. Comments initiated by any individual member of a discussion group can logically take only three directions. They may be directed to the discussion leader, to another member of the group, or to the group as a whole. We recorded and examined each of these contingencies by determining the intercorrelations between them across meetings. In general, these three types of discussion interaction were highly correlated, so that any one of them could have been used independently as a representative index of extent of interaction between an individual and other members of the group. Since most of the comments by the subjects were directed toward other specific individuals, this single measure was taken as an indication of interaction status.

### C. RESULTS AND DISCUSSION

In order to obtain information bearing upon the questions posed by the investigation it was necessary to estimate the degree of relationship between the following sets of variables for each of the two groups: (*a*) Interaction status and friendship status, (*b*) Interaction status and leadership status, (*c*) Friendship status and leadership status.

Since the three indices were obtained by ranking, it was necessary to analyze the results by a statistical technique applicable to ordinal scores, thereby imposing no restrictive assumptions regarding their distribution. Furthermore, since the focus of the study was upon examining relationships between interaction and uncontaminated indices of friendship and leadership a rank correlation technique was required whose partial had been derived. The single statistical tool meeting these requirements is Kendall's *tau* (8). The partial correlations thus examined were as follows: (*a*) Interaction status and friendship status independent of leadership status, (*b*) Interaction status and leadership status independent of friendship status, (*c*) Friendship status and leadership status independent of interaction status.

Each of the above relationships was tested for significance, with .05 as the level of acceptability. The results are shown in Tables 1 and 2.

It is apparent from Table 1 that a positive correlation exists between interaction status and both friendship and leadership in Group *A* and between interaction status and leadership in Group *B*. From this table, however, it is not clear whether either friendship or leadership considered independent of the other would relate significantly to interaction status. Friendship status and leadership status in both discussion groups were highly correlated, indicating that those individuals who received the most votes for group officers were also frequently chosen as friends.

TABLE 1  
SUMMARY OF TAU VALUES WITH SIGNIFICANCE LEVELS\*

Group <i>A</i>			Group <i>B</i>		
IS	FS	LS	IS	FS	LS
IS	—	—	IS	—	—
FS	.287	—	FS	.150	—
	<.05	—		>.10	—
LS	.490	.654	LS	.288	.438
	<.01	<.001		<.05	<.01

\* With  $N = 18$ ,  $\tau$  must have a value  $\geq .282$  to reach significance at the .05 level with a one-tailed test. With this  $N$ ,  $\tau$  is equal to a  $Z$  of 1.65.

The next step in the analysis, therefore, was to partial out the respective contributions of friendship and leadership to the correlation with discussion interaction. Partial  $\tau$ s calculated from the  $\tau$ s reported above are shown in Table 2.

TABLE 2  
SUMMARY OF PARTIAL TAU VALUES

Group <i>A</i>		Group <i>B</i>	
(IS) (F) · (L)	= -.045	(IS) (F) · (L)	= .026
(IS) (L) · (F)	= .411	(IS) (L) · (F)	= .247
(F) (L) · (IS)	= .610	(F) (L) · (IS)	= .421

Conclusions to be drawn from the data are based on the partial  $\tau$ s presented above. It must be pointed out, however, that no distribution has been derived for partial  $\tau$ s as yet, and any conclusions relating to the statistical significance of a particular partial  $\tau$  must be argued by inference from the significance levels associated with each  $\tau$  used in the calculation of the various partials. It can be argued that because the  $\tau$  values ( $\tau_{(IS)(L)}$  for Groups *A* and *B*) are significant the partial  $\tau$ s reflecting these same relationships, being of approximately the same magnitude, are also significant, since the relationship is not confounded with the effect of a third variable. We have in effect a "purer" measure of the various relationships under



investigation. Only if the partial *taus* were of considerably different magnitudes from their respective *taus* would this type of inference be difficult to make. The distribution of the *tau* statistic has been tabled, and significance levels can be associated with any given value.

All *tau* values in Table 1 are significant beyond the .05 level with the exception of  $\tau_{(IS)(F)}$  for Group *B*. This is consistent with the fact that  $\tau_{(IS)(F)(L)}$  is not significant for either Group *A* or *B*. The partial *taus* between interaction status and friendship status in the independence of leadership are  $-.045$  in Group *A* and  $.026$  in Group *B*, indicating that the significant  $\tau_{(IS)(F)}$  for Group *A* is probably an artifact resulting from a contamination of friendship status with leadership status. Since  $\tau_{(IS)(F)}$  for both groups is considerably larger than the respective partial *tau* values, the results demonstrate that friendship status in the absence of leadership status of the same magnitude is not related to interaction status in the discussion situation. Also, since the partial *taus* between interaction status and leadership status for both groups are of similar magnitude to their respective *taus*, a positive relationship exists between interaction status and leadership status regardless of friendship status. Following the same line of reasoning, it is also evident that friendship status and leadership status are highly related regardless of discussion contribution (IS), since  $\tau_{(F)(L)} = .654$  and  $.438$ , while  $\tau_{(F)(L)(IS)} = .610$  and  $.421$ .

Inasmuch as it is somewhat difficult to conceive of interaction status being related only to leadership, when leadership is highly correlated with friendship, the following diagram of the logic involved may be useful.

The results confirm our earlier findings that discussion of a communication in the small group situation is largely confined to that segment of the group that enjoys superior status in a number of respects and chiefly with regard to education and leadership. From the present results, it is apparent that not only are the leaders of such groups the most vocal participants in discussion, they also address most of their comments to each other. Those participants who do not enjoy a high degree of leadership status tend to direct their remarks toward those whom they perceive as the leaders. Although group leaders also rank high with respect to friendship choices, it is leadership rather than friendship which determines the individual's position in the hierarchy of discussion interaction.

#### D. SUMMARY

Sociometric choices on friendship and leadership criteria were made by members of two community groups who engaged in three discussion sessions concerning mental health films. Indices of friendship and leadership

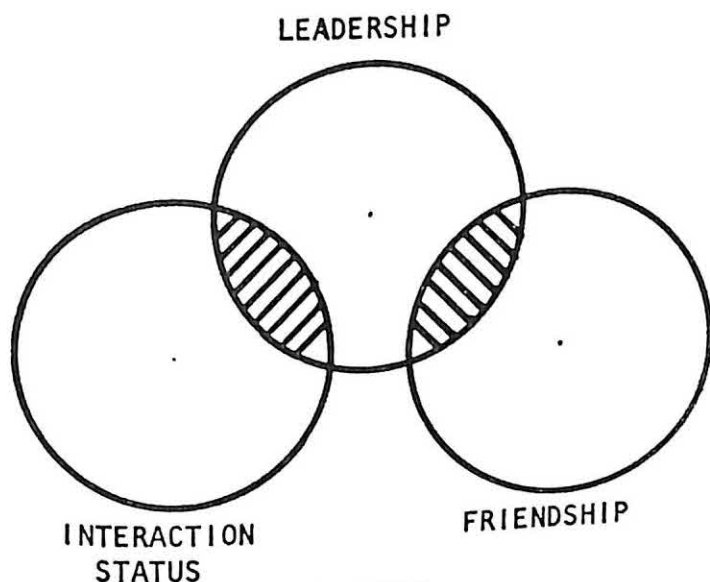


FIGURE 1

Each circle schematically represents the total variance of each of the three variables. Shaded areas represent approximations of the appropriate common variance between each of two factors.

status were obtained from these groups and related by nonparametric correlational methods to an index of verbal activity, labeled interaction status. It was found that leadership status and interaction status were highly correlated, as were leadership status and friendship status. Friendship status and interaction status, however, were not correlated. Those discussion participants who were relatively low in leadership status directed their comments to those members whom they identified as leaders. Friendship status apparently does not itself influence an individual's interaction status within the small discussion group. These results suggest that discussion of a communication in the small group situation is largely confined to the perceived leaders of the group.

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# THE RELATIONSHIP BETWEEN CERTAIN GROUP PROCESS VARIABLES AND GROUP PROBLEM-SOLVING EFFICIENCY\*

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## A. PROBLEM

A recent report (6) presents the rationale and description of a task to be used for studies of group problem-solving. Certain general functions which a group must fulfill in order to solve a "continuous"<sup>2</sup> problem are postulated and a task which allows relatively precise identification of the component functions is described. The task and functions are based rather directly on a general paradigm of group performance in which it is suggested that goal directed behavior on the part of a group may be conceptualized as a sequence of locomotions in an abstract "task space" (p. 105, 5). This task space is defined by a set of variables in terms of which the status or relationship of the group with respect to its environment can be represented. Within the task space there exists a region, designated the "target" region, which is the objective or goal of performance.

A given behavior on the part of the group at any point in the task space will "transport" it to a new point and a correct sequence of responses will transport it to the goal. Hence, three broad functions would appear to be required of the group: it must *orient* itself with respect to its environment, it must develop a *map* or set of action rules which reflect its "knowledge" of what the locomotion effects will be of a given response when at a given position in the task space, and it must develop a *jurisdiction* structure whereby responsibility and authority are distributed in such a way that the responses suggested by the rules or "map" can be implemented.

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<sup>1</sup> Data upon which this study is based were collected while the authors were at the Air Force Personnel and Training Research Center, Lackland Air Force Base, San Antonio, Texas, in support of Project 7713.

<sup>2</sup> A "continuous" problem is thought of as one in which the solution can only be achieved by a sequence of correct responses. The "path" to the goal is characterized by a sequence of choice points with the correct choice at each juncture being a function of the "state" of the environment and the rules or principles of the problem. In an abstract sense such characteristics are evident in many "real life" problems that face groups, e.g., economic problems, ethical problems, etc., in which there may be general principles of solution, but which require continual translation of these principles into tactical form.

The paradigm appears to represent, in a general way, the essential characteristics of a wide range of group-task systems, e.g., bomber crews, air defense teams, etc. However, as a descriptive model, it does not offer theoretical suggestions concerning the "action characteristics" of groups which may influence their successful accomplishment of the requisite functions; it merely presents one way of partitioning the task-oriented processes of the total system. The relationships between various characteristics of group structure and process and the hypothesized factors in group performance will presumably emerge from empirical research using tasks based rather directly on the proposed paradigm.<sup>3</sup>

The present study represents an exploratory effort to uncover such relationships. An attempt was made to induce group differences in approach to the task—and presumably performance differences—directly by use of certain training methods, in an effort to highlight the structure and process factors that were related to performance. A secondary objective was to find a training method by which groups could economically be brought up to asymptotic performance levels for later, more precise, studies of group structure and performance.

## B. PROCEDURE

### 1. *Apparatus and Task*

The apparatus and its underlying rationale have been described fully in a previous report (6). Briefly, the basic apparatus consists of a central control unit and three test boxes, each connected to the control unit by a flexible cable. Each test box contains a white, green, and red (W, G, R) light bulb, arranged in a triangle, and a response push button. Only one bulb on each test box is lit at any time.

Depressing a response button changes the bulb which is lighted on one or more of the test boxes: the change is always to the adjacent bulb in a clockwise direction, e.g., from red to white to green to red, etc. Switches on the central console allow the experimenter to select any linkage between push buttons and signal lights; any push button can be made to change the lighted bulb on any test box. In the present experiment only two "linkages"

<sup>3</sup> The extent to which the relationships already established in other research will generalize to tasks of the sort described is, of course, unknown. As Kelley and Thibaut in their recent review note, the primary focus of research in this area has been on planning processes, "... which should be viewed as merely one aspect of the task-oriented processes of the total social system. This area of research is only a part of the broader topic which we might label group locomotion and which has to do, in general, with the operations by which groups change their positions within or effect changes upon their social and physical environment" (3, p. 736). The task described includes both planning and locomotion requirements.

of buttons on signal lights were used. In Linkage *A* each button changed the light on its own box and one other box, while in Linkage *B*, each button changed the signal lights on only the other two boxes. These linkages are shown diagrammatically in Table 1.

TABLE 1  
SCHEMATIC DIAGRAM OF BUTTON-SIGNAL LIGHT LINKAGES

		Box 1	Lights Box 2	Box 3
Linkage <i>A</i>				
	Box 1	X	X	—
	Box 2	—	X	X
Linkage <i>B</i>	Box 3	X	—	X
	Box 1	—	X	X
	Box 2	X	—	X
	Box 3	X	X	—

*Note:* A "X" entry indicates that the push button on the box indicated in a row advanced the light on the box indicated in a column.

In operation, initial settings of the lights on each of the three test boxes are controlled by a master stepping switch. The light combinations are then changed by the subjects (by depressing the push buttons) until a target setting, selected by the experimenter, is attained. (In the present experiment the goal was to have the red bulb on all three boxes lighted). At this time a buzzer sounds for 5 seconds, the lights all go out for a 2-second interval and then a new initial setting appears. This is repeated for 11 automatically programmed trials, then the lights "go dead" altogether until the device is reset.

In use as a group task, as in the present experiment, one test box was presented to each of three subjects (*Ss*). Each *S* thus had access to only part of the information required for solution (the lights which are activated on each of the test boxes) and had control over only one of the push buttons. The *Ss* were seated in booths which prevented direct interaction, a standard, aircraft interphone circuit being the only means of communication between them.

During the experiment, criterion measures of performance were obtained by continuously recording on an Esterline Angus operations recorder the signal light positions of the three test boxes after each response, as well as the responses themselves. Since for every initial setting of the lights it was possible to calculate the minimum number of responses required to reach the target position, an error score was easily determined. In addition, the total



time for solution of each problem was obtained. Detailed records of group interaction were also obtained by recording all communications over the interphone circuit on a standard, single channel, tape recorder.

## 2. *Subjects and Experimental Design*

The experiment was divided into four sessions. In Session I each group "solved" a series of 11 problems using Linkage *A*. This preliminary session established a baseline for performance changes and gave the groups general familiarity with the requirements of the task. Session II was devoted to one of the six experimental treatments described below. Following the "training" experience of Session II, all group members were given a questionnaire designed to assess the extent of knowledge of the display-control map and the method of solution of the problems.<sup>4</sup> In Session III each of the groups again performed a series of 11 problems, as in Session I, while in Session IV, 11 problems were again presented but the display-control relationships were those designated as Linkage *B*.

The *Ss* were Air Force basic trainees in their third to eighth week of basic training at Lackland Air Force Base. Six *Ss* at one time were received, and fortuitously divided into two groups of three members each. The experimental training methods were randomly ordered prior to the arrival of the *Ss* and groups were assigned to a method in the order in which they were received. There were six experimental training conditions, with three groups per condition, giving an *N* of 18 groups.

## 3. *Experimental Conditions*

Congruent with the objectives noted earlier the choice of training methods as experimental treatments was based on consideration of two factors: would the methods be likely to produce procedural variations, and did the methods appear *a priori* to show promise as means of rapidly improving group problem-solving performance. The paucity of data on group training allowed no other basis than "arm chair" speculation in making the selections.

The training methods used as experimental treatments during Session II were as follows:

*a. Principle.* Groups did not work with the test boxes. They were placed in a different room, and given a work book which contained an explanation of the principle of solution, a set of problems with their solutions in diagram-

<sup>4</sup> Direct questions were asked concerning the linkage and direction of movement of the lights. Also, five problems were presented for solution, i.e., an initial setting was given and *Ss* were asked to indicate the sequence of buttons to be pressed.

atic form, and some practice problems. They were told that they had 30 minutes to work together to solve the practice problems after which they would return to the test situation.

*b. Conference.* Groups did not work with the test boxes but were brought to a different room and given approximately 30 minutes during which they could talk with each other about the problem. They were informed that the lights changed according to a definite rule and were asked to use the time to discuss what the rule might be, how they could test possible solutions, and how they could go about solving the problem in the best way possible. They were told that another performance session would follow the discussion period.

*c. Pony.* Groups worked on another series of 11 problems, but each *S* in the group was now supplied with an identical card that designated the correct move to make when the lights were in a given position. *Ss* had only to consult their "pony" to determine the proper response for any signal light combination. They were informed that the session was only a practice period after which they would work on the problem again without further aids.

*d. Straight practice.* Groups under this condition performed exactly as in Session I, solving 11 problems as a group. No special instructions or aids were provided.

*e. Individual practice.* Under this condition each group member separately, solved a series of 11 problems. All three test boxes were placed in a single booth; *Ss* thus had access to all the information required for solution and also had control over the three response buttons. The order in which *Ss* in a group worked was randomized.

*f. Control.* Groups under this condition were removed from the experimental room and placed in an ante-room for approximately 30 minutes. Magazines were available. They received no additional practice or training in Session II. *Ss* were prevented from discussing the problem by the presence of an *E* at all times.

## C. RESULTS

### 1. Performance Scores

The two criteria for performance effectiveness used were time and error scores. Time scores represent the total time spent on a trial from initial presentation of a problem to completion, excluding the fixed intertrial period. Error scores represent the total number of button punches on a trial.<sup>5</sup>

<sup>5</sup> Both the time and error score distributions were highly skewed toward the high end. Informal observation suggested that the non-normality arose not from

Tables 2 and 3 present the means of the reduced time and error scores for the three performance sessions (I, III, and IV). A co-variance analysis was done employing third and fourth session scores as dependent variables

TABLE 2  
MEANS OF REDUCED TIME SCORES (SECONDS) BY EXPERIMENTAL CONDITIONS AND SESSIONS

Session	Control	Training condition		Pony	Conference	Principle
		Straight practice	Individual practice			
I	50.3	45.0	57.0	41.0	57.3	36.3
III	29.3	43.7	20.7	20.3	24.3	30.7
IV	29.3	31.7	27.0	23.0	24.3	26.0
Total	109.0	120.3	104.7	84.3	109.0	83.0

TABLE 3  
MEANS OF REDUCED ERROR SCORES BY EXPERIMENTAL CONDITIONS AND SESSIONS

Session	Control	Training condition		Pony	Conference	Principle
		Straight practice	Individual practice			
I	19.0	17.3	13.3	10.3	18.3	9.7
III	9.0	10.7	9.3	5.0	5.0	5.3
IV	8.0	8.7	7.3	6.3	5.0	7.0
Total	36.0	37.0	30.0	21.7	28.3	22.0

and first session scores as co-variance controls. For both time and error scores, the mean squares for between-sessions (comprising group variance and interaction) are significantly greater than within-sessions variance as might be expected in view of the score transformation ( $F$ 's of 43 and 33 respectively with two and 324 d.f.). Neither "training conditions" nor "replications" are significant as compared with their interactions. However, the overall

the metric itself but from typical performance phenomena. It was frequently observed that groups with little or no notion of the principles involved hit one or two solutions quite by accident, while groups doing fairly well would "blow up" on a trial after several minor errors. It was decided for this reason to eliminate from session scores the best two and poorest two trials.

Two drawbacks to this procedure should be noted. First, it rules out any possibility of eliminating constant trial differences from estimates of within-session variance since different trials are eliminated in each session. However, preliminary analysis indicated that systematic trial effects were not sufficiently pronounced to make this an important consideration. A second objection is that the elimination of extreme scores for sessions may tend to inflate the apparent reliability of session means (1). It seems much more important, however, to insure that the scores be representative of group proficiency than that an exact reliability estimate be available. The scores used in the following analyses, then, are the reduced time and error scores obtained by eliminating the two extreme scores on each end of the distribution for each session.



mean squares due to group differences, comprising these three scores, are significantly greater than their interaction with sessions ( $F$ 's of 5.19 and 4.83 for time and error scores, respectively, with 20 and 324 d.f.). Apparently, the reduced score means consistently differentiate between groups over sessions. Finally, session mean squares are significantly larger than their interactions with group effects ( $F$ 's of 8.80 and 12.00 for time and error scores respectively, with 2 and 34 d.f.).

It appears that experimental treatments have little effect on mean time or error scores but that group scores are consistent within sessions and change in some fairly uniform fashion from session to session. Examination of session means shows that this change occurs almost entirely between the first and third session. During the fourth session, in which the "transfer" problem is introduced, there is a slight increment in both time and error means. Whether this should be interpreted as an asymptote in the learning curve, or a setback due to unfamiliarity, and/or greater difficulty of the transfer problem, cannot be determined from these data.

The results do not encourage further search for differences among the training methods—either by more extensive analysis or by adding further replications. Even such differences in treatment means as do appear are not in accordance with the general *a priori* expectation that all of the training methods would be more effective than no training. Apparently the training experience had little influence on group time or error scores on this task.

## 2. Communication Analysis

As noted in the procedure section, tape recordings had been obtained of each of the three performance sessions for each group. A simple scoring system employing the following seven categories was used for content analysis; voluntary information reports, requests for information, responses to requests for information, direct orders, responses to direct orders, procedural suggestions, and miscellaneous remarks. Two judges working independently, categorized all statements made in the first five minutes of each performance session,<sup>6</sup> indicating the source and frequency of communications in each category. The final scores for  $S$ s are the average frequencies obtained by the two judges for each category.<sup>7</sup>

<sup>6</sup> Since a categorization of the entire session was unfeasible  $E$ s' judgments of high consistency of interaction were relied upon in selecting the sample for content scoring. The stable relationships obtained across sessions in the analyses supports the validity of the judgments.

<sup>7</sup> Interscorer agreement was judged to be high but no estimate will be reported since there was some consultation before final scores were obtained. This consisted of agreeing on the source of communications which had to be determined by voice quality and similar cues.

From these frequency scores, a number of indices were computed based on theoretical considerations or on impressions obtained in informal observations of the groups. Gross frequency scores and indices which were investigated were as follows:

*Index 1.* Total communications in all categories. This was used to ascertain the degree to which relationships between other categories and performance might be attributed to gross frequency.

*Index 2.* The total number of messages which were judged as volunteering information.

*Index 3.* The total number of responses to requests for information.

*Index 4.* The ratio of Index 3 to the sum of Indexes 2 and 3, or the proportion of transmitted information which is volunteered.

These last three indices are presumed to reflect the efficiency with which groups orient themselves with respect to the task variables (the position of the lights on the test boxes). Since volunteered information requires fewer messages (half the number) than information which must be "solicited" it would appear to be more efficient. One might expect therefore, a positive relationship between performance criteria and Indexes 2 and 4, and a negative relationship between performance and Index 3.

*Index 5.* The percentage of the groups' total of requests for information, orders, and procedural suggestions initiated by the primary contributor. This was intended as an index of centralization of "leadership" and was suggested by the finding of other investigators that "equal participation" of group members was positively related to group performance (2). Thus, a negative relationship between degree of centralization, as measured by this index, and the performance criteria would be predicted.

*Index 6.* The percentage of requests for information, orders, and procedural suggestions contributed by the top two contributors. Like Index 5, this measures the distribution of "leadership acts" but it also taps the degree of exclusion or nonparticipation of the third group member. Segregation into a pair and a third party has been demonstrated to occur in three person groups (4). However, the consequences of such alliances for group problem-solving efficiency are unknown.

*Index 7.* A proficiency measure for each *S* was obtained by summing the scores on "knowledge" items of the test given at the end of Session II and a leadership score was obtained by summing the number of requests for information, orders, and procedural suggestions. Proficiency scores were correlated with leadership scores for each group and the correlation was the measure of "leadership-proficiency congruence" for that group. Since a



randomly formed group will generally be composed of members differing in ability to contribute to problem solution it is reasonable to assume that a groups' efficiency will be a function of the extent to which the more capable members are able to influence the group's exploration and decision making. Thus, a positive correlation between this measure and the performance criteria would be expected.

*Index 8.* A "leadership-aptitude congruence" index. This was computed in the same way as Index 7 except that a measure of general intelligence (score on the Air Force AFQT test) was substituted for the proficiency measure. A rationale similar to that for Index 7 underlies the development of this index.

*Index 9.* A leader "information control" index. In many of the groups a dominant member tended to maintain control of decision making by the simple expedient of not reporting information to other group members. To obtain an estimate of this behavior the individual with the highest percentage of requests for information, orders, and suggestions within a group was selected and his percentage of such "leadership acts" reduced by the percentage of volunteered information and responses to requests which he contributed. Thus groups in which the "dominant" individual refused to (or at least neglected to) share information with other group members score high on this index. It is assumed that such information withholding tendencies interfere with the effective orientation of all group members and thus, in general, decrease the probability of "correct" decisions. A negative relationship between this measure and the performance criteria is expected.

Two types of analysis of these scores are of interest; first, the degree to which they characterize separate groups consistently or with uniform changes due to training and practice; second, their relationship with performance measures. The first problem was studied by analysis of variance of those indices which could be computed by session. Table 4 presents the *F*-ratios and reliability estimates for each of the indices.<sup>8</sup> The Hoyt reliability estimates give some evidence that these indices measure stable group characteristics. The consistency over sessions which is evident for most of the indices justified the use of a pooled index score for subsequent analysis.

Table 5 presents correlations between the indices described and time and error scores. They are based on pooled index scores for Sessions III and IV vs. mean performance scores. Correlations based on all three sessions (I, III, IV) were essentially the same. In examining these correlations it

<sup>8</sup> The analysis also included training methods. These proved non-significant in all cases and have been omitted for simplicity.



TABLE 4  
HOYT RELIABILITIES AND F-RATIOS<sup>a</sup> FOR PROCESS INDICES

Index	3 Session		2 Session	
1: Total communication	$r_{tt}$	.81		.86
	$F_1=5.19^{**}$	$F_2=.61$	$F_1=7.04^{**}$	$F_2=1.68$
2: Volunteered information	$r_{tt}$	.89		.94
	$F_1=9.07^{**}$	$F_2=8.36^{**}$	$F_1=15.59^{**}$	$F_2=2.80$
3: No. responses to requests	$r_{tt}$	.87		.88
	$F_1=7.31^{**}$	$F_2=3.93^*$	$F_1=8.33^{**}$	$F_2=3.95$
4: Ratio of status reports to responses to request	$r_{tt}$	.86		.94
	$F_1=6.92^*$	$F_2=1.71$	$F_1=18.22^{**}$	$F_2=3.95$
5: Centralization of leadership	$r_{tt}$	.61		.76
	$F_1=2.58^*$	$F_2=1.01$	$F_1=4.14^{**}$	$F_2=.0$
6: Degree of exclusion	$r_{tt}$	.77		.86
	$F_1=4.36^{**}$	$F_2=.54$	$F_1=7.29^{**}$	$F_2=.41$

<sup>a</sup>  $F_1$  in each case is the variance for groups divided by group x session interaction, with 17 and 34 *df* for three session and 17 and 17 *df* for two sessions. This is the F-ratio on which the Hoyt reliability estimates are based.  $F_2$  is the ratio of session mean squares to group x session with two and 34 for three sessions and one and 17 *df* for 2 sessions.

\* Significant at the .05 level.

\*\* Significant at the .01 level.

should be recalled that higher criterion scores reflect poorer performance, thus, positive correlations indicate that high scores on the predictor variable (the indices) are associated with poorer performance, while negative correlations indicate the converse.

It is evident that gross amount of communication (Index 1) is not related to the performance criteria. Volunteered reports (Index 2) are

TABLE 5  
CORRELATIONS BETWEEN COMMUNICATION PROCESS INDICES AND (REDUCED) TIME AND ERROR SCORES (BETWEEN GROUPS,  $N=18$ )

Indices	Error	Time
1. Total no. messages		
2. Number status reports	-.15	.05
3. Number responses to request	-.13	-.43
4. Extent of "volunteering"	.20	.48*
5. Centralization of leadership	-.22	-.52*
6. Degree of exclusion	.28	.10
7. "Proficiency-leadership"	.49*	.31
congruence		
8. "Ability-leadership"	-.25	-.06
congruence		
9. Leader "information-control"	-.28	-.24
	.24	.26

\* Significant at the .05 level.

negatively correlated with time scores and apparently unrelated to error scores. This is not surprising if it is assumed that volunteering of information in a self-paced task such as this is largely a time saving device. Responses to requests for information (Index 3) on the other hand, are positively related to both time and error scores. This relationship is probably best interpreted as being symptomatic—where information must be continually solicited, motivation and coordination are probably poorer. As would be expected from the foregoing results, the correlations between the ratio of volunteered to total information (Index 4) are negative.

Both indices (5 and 6) indicating centralization or limited distribution of "leadership" are associated with higher time and error scores. It is worth noting that these correlations, unlike those for the indices relating to information reporting, are more strongly associated with error than with time scores. To over-generalize, for a moment, to much broader social phenomena, we might expect an oligarchy to act as fast as a democratic group, but to be more prone to make mistakes.

Both "proficiency congruence" (Index 7) and "aptitude congruence" (Index 8) show significant correlations with performance scores in the expected (negative) direction. The results indicate that groups in which the most able persons take control are more effective than groups in which less able persons take control. Finally, the degree of "leader information control" (Index 9) correlates with time and error scores in the expected (positive) direction.

One additional relationship is of interest, that between the groups' "knowledge" of the principle of operation and their performance. The former was measured by the quiz administered at the end of Session II: group scores were the average of the scores obtained by the three members of a group. The correlations between average quiz scores and mean time and error scores for Sessions III and IV were  $-.39$  and  $-.53$  respectively. As expected, better average quiz scores are associated with lower time and error scores. However, the relationships are not as high as one might expect considering the fact that the quiz is a rather direct measure of the level of understanding of the principles of solution of the problems.

Despite the small number of cases it was felt some better defined suggestive hypotheses might emerge from a consideration of the relative contribution of several of the measures to time and error score variance. Five relatively independent measures were selected, Indices 4, 6, 8, 9, and the mean quiz scores, and multiple correlations with time and error scores computed. Scores for all the variables were transformed into standard score form.

The beta coefficients and multiple correlations are shown in Table 6. The relative importance of the variables is best estimated by the magnitude of the squares of the presented beta coefficients. Indices 8 and 6 and average quiz scores contribute most to the predicted variance of error scores, while Indices 8 and 4 and quiz scores "explain" most of the predicted variance of time scores. Thus, the way the group "utilizes" its resources and the procedures it employs for communicating essential information are as important, if not more important, than "knowledge" of the problem for determining its performance.

TABLE 6  
BETA COEFFICIENTS AND MULTIPLE CORRELATION COEFFICIENTS OF INDICES WITH TIME AND ERROR SCORES

$\beta$ 's for error scores	Index	$\beta$ 's for time scores
— .114	#4: volunteering	— .561
.379	#6: exclusion	.181
— .524	#8: "ability-leadership" congruence	— .401
— .156	#9: information-control	— .263
— .382	mean quiz scores	— .315
Multiple correlation		
.714		.690

#### D. DISCUSSION

The results do not reveal any effects that can be attributed to training conditions employed in this study; no differences in gross performance scores or various measures of group interaction can be attributed to training. There is evidence however, that group behavior is consistent within sessions and that improvement in performance occurs between initial experience with the task and later occasions for performance. Thus, it does not appear justifiable to attribute the lack of significant results for the training methods to capriciousness of the behavior measures or the performance criteria.

One possible inference, supported by the analysis of intragroup communications, is that strong factors internal to the group, arising from group composition and organization<sup>9</sup> attenuate the effects of external influence. In particular, it appears that best performance is shown by groups in which

<sup>9</sup> By composition factors we mean those group characteristics that are direct consequences of the distribution of individual member characteristics. By organizational factors we mean characteristics relating to allocation of functions and responsibilities which are imposed on the group or which arise through the interplay of composition factors and group experiences. In the case of "pick-up" groups, such as those used here, it is difficult to see how organizational factors of any degree of stability emerged, but the results would indicate that some degree of stability was achieved.



information is volunteered rather than solicited; groups in which "leadership" and participation is well distributed; and, groups in which "leadership" is congruent with ability differentials. There is also a suggestion that the control of "leadership" by withholding information from other group members is associated with poorer performance.

The indices and "quiz" scores are related rather directly to the hypothesized functions in group performance discussed earlier, and the results serve to support the general notions as well as supply additional clarification. In general, interference with the effective *orientation* of group members adversely influenced performance. In the present task, such interference resulted from inefficient procedures (the use of a "soliciting" rather than a "volunteering" system for information exchange) and from behavioral tendencies of group members (withholding information). The results also clarify the type of *jurisdictional* structure which is related to effective performance. In general, where the relative contribution of individuals to decision making was congruent with their relative differences in ability, performance of the group was better. However, over-dominance of the decision making by any one, or even two group members resulted in poorer performance as did attempts to control decision-making by withholding information. It would appear that a jurisdictional compromise was most effective: the most able group member exerted the most influence on decision-making but the other group members were fully informed and retained some measure of control. Finally, as would be expected, the extent to which the group "learned" the principle of solution and how to apply it was positively related to performance. The correlation between quiz scores and later performance, however, was lower than expected and further supports the importance of procedural and structural influences on group problem solving efficiency.

It is interesting to note that indirectly the results support the apparent wisdom of the majority of studies on group problem solving. The predominant emphasis in such studies has been on variables of group structure or affective aspects of the interactive process—little attention has been devoted to cognitive variables in the group problem solving process (e.g., 3). In both the present and a previous study where measures of intellectual ability and "knowledge" were obtained, the contribution of these variables to the variance of performance scores proved to be relatively minor as compared to measures of structural or procedural factors.

Until further research clarifies the role of cognitive variables it is foolhardy to draw any firm conclusions. However, it is not unreasonable to suggest that training designed to improve group problem solving performance

may more profitably be directed to increasing the groups' awareness of the role of structural and procedural factors in the problem solving process than to increasing the general knowledge or skill level of the group.

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## SOCIAL PERCEPTION AND SELF-PERCEPTION OF HIGH AND LOW AUTHORITARIANS\*

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### A. PROBLEM

A major topic of *The Authoritarian Personality* (1) is the relationship between people's scores on the F-scale and their perception of themselves and others as determined through interviews and clinical tests.

The present study is an extension of this work using an old technique for the experimental study of interpersonal perception which has been revived recently, that is, requiring Ss to rate others on personality traits on the basis of their facial features.

The data were treated by analysis of variance followed by estimation of components of variance, a procedure which provided certain measures of tendency to dichotomize, rigidity, acquiescence, and other properties of behavior which have been reported for high authoritarians in some situations (1, 12).

### B. METHOD

The Ss were 36 male undergraduates from an introductory psychology course in Johns Hopkins University. They were selected on the basis of scores obtained from a group administration of a 30-item F-scale (1). One group of 18 Ss had scores in the highest quarter of the distribution, with individual mean scores ranging from 4.10 to 5.20. Another group of 18 Ss had scores in the lowest quarter of the distribution, with individual mean scores ranging from 2.43 to 3.17. The groups appear to qualify as high and low authoritarians by the standards of *The Authoritarian Personality*.

The Ss were presented with pictures (photographs) of the faces of 10 men and 10 women who varied widely in age and physiognomic characteristics.<sup>1</sup> The Ss rated these people on 12 varied personality traits: dominating, imaginative, sexually intense, hostile, manly, lucky, has loose morals, good, feeble, knows all the angles, conforms to society, and feminine. Ratings were made on a 7-category scale under instructions similar to those of Secord, Dukes, and Bevan (10, p. 242).

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<sup>1</sup> The authors are grateful to Drs. Donald T. Campbell and Leroy S. Burwen for supplying the photographs used in this study.



The pictures were projected on a screen one at a time. The *Ss* rated each picture on all traits before the next picture was presented. Rating booklets were used which prevented *Ss* from seeing their ratings of previous pictures.

After rating the pictures, the *Ss* rated themselves on the same traits.

### C. RESULTS

#### 1. Picture Ratings

The high authoritarians' over-all mean rating of pictures was 3.85, while the low authoritarians' was 3.83. Both means are close to 4.00, the middle of the 7-category rating scale. The positive response set or acquiescence which high authoritarians have exhibited in some tasks (5, 12) was not manifested in these ratings.

Analyses of variance of the picture-rating data for the two groups of *Ss* are summarized in Table 1. Estimates of the components of variance from

TABLE 1  
ANALYSES OF VARIANCE OF PICTURE RATINGS

Source	<i>df</i>	High authoritarians		Low authoritarians	
		Mean square	Component	Mean square	Component
Traits (T)	11	98.14*			
Pictures (P)	19	8.27	.22	47.78*	.08
<i>Ss</i>	17	26.03*	— .03	3.85	— .06
T X P	209	14.68*	.08	22.68*	.07
T X <i>Ss</i>	187	5.74*	.73	14.46*	.71
P X <i>Ss</i>	323	2.45*	.21	5.01*	.18
T X P X <i>Ss</i>	3553	1.62	.07	1.44	— .03
			1.62	1.74	1.74

\* Significant effect at the .001 level by *F* test.

the different sources were obtained from linear combinations of the mean squares according to procedures discussed by Lindquist (8) and Kepthorne (7).

The estimated components total 2.90 for the high authoritarians and 2.69 for the low authoritarians, yielding 1.70 and 1.64 as estimated standard deviations of the distributions of picture ratings by the two groups. The high authoritarians evidently tended to give slightly more extreme ratings than the low authoritarians, but the difference appears too slight to require an invoking of general intolerance of ambiguity or tendency to dichotomize (1, 4).

The very large components of variance due to the traits X pictures interaction, a quarter of the total variance for both groups, indicates that *Ss* in both groups showed substantial agreement on how the photographed persons

differed on traits. The agreement extended across the groups, according to an analysis in which the data for the two groups were combined. In this analysis the groups X traits X pictures interaction was small and non-significant. This result too argues against a general tendency of high authoritarians to dichotomize, for example, to rate certain women unduly high and other women unduly low on "sexually intense" (1). It also appears to argue against a general inadequacy of social perception on the part of high authoritarians (6, 12).

Variance due to traits represents a response set shared by Ss to give higher ratings on some traits than on others. For the high authoritarians, this component was 8 per cent of the total variance, while for the low authoritarians it was only 3 per cent of the total variance. In the analysis of the pooled data, this difference was evidenced as a groups X traits interaction significant at the .025 level.

Table 3 shows the mean ratings given on the various traits by the two groups, serving to specify the role of traits as a source of variance in their ratings. The differences between the groups on these means are relatively small and might seem merely a matter of global response sets—the high authoritarians tending to give more extreme mean ratings (in the same direction from 4.00) on traits than the low authoritarians. However, when the differences are examined in detail, their directions seem generally consistent with earlier work on authoritarianism, and they could hardly be expected to be very large for groups which are no more extreme than the upper and lower quarters.

The high authoritarians seem to regard the photographed strangers as generally threatening, relative to the low authoritarians, as indicated by the high ratings they give the strangers on "dominating," "hostile," and "knows all the angles." The relatively high ratings on "manly" and the low ratings on "feeble" and "feminine" appear also to reflect perceived threat. The relatively high ratings on "has loose morals," and, perhaps, on "sexually intense," with low ratings on "good" and "conforms to society," suggest both fear of the strangers and hostility toward them (moralistic condemnation, 1, p. 406).

Variance due to the traits X Ss interaction represents response sets varying among Ss to give higher ratings on some traits than on others. Such individually unique response sets seem equally important in both high and low authoritarians, contributing 7 per cent of the total variance for each group.

Variance due to pictures represents a tendency for some pictures to receive higher ratings than others, a type of halo effect which would not be expected

for ratings on the present random mixture of "good" and "bad" traits, and did not occur (the negative estimates may be regarded as 0.00).

Variance due to *Ss* represents tendencies for some *Ss* to give higher ratings than others, response sets which might be interpreted as leniency errors if the traits were all "good" or "bad," but here appear to be a type of rigidity. This component is present in equal but slight degree (3 per cent of the total variance) for both groups.

Variance due to the pictures X *Ss* interaction would represent halo effects differing among *Ss* if the traits were all "good" or "bad," but here also appears attributable to a type of rigidity. This component is present in the high authoritarians' ratings (2 per cent of the total variance) but not in the low authoritarians' ratings.

The residual variance component, the variance in ratings not accounted for by the above sources, is somewhat over half the total variance for each group.

## 2. Self-Ratings

The high authoritarians' over-all mean self-rating was 3.96, while the low authoritarians' was 4.00. Like those for picture ratings, these means are close to the center of the 7-category rating scale.

Analyses of variance of the self-ratings by the two groups of *Ss* are summarized in Table 2, which also shows estimates of the components of variance from the three sources for each group.

TABLE 2  
ANALYSES OF VARIANCE OF SELF-RATINGS

Source	<i>df</i>	High authoritarians		Low authoritarians	
		Mean square	Component	Mean square	Component
Traits (T)	11	35.06*	1.88	26.19*	1.35
<i>Ss</i>	17	1.91	.06	2.38	.04
T X <i>Ss</i>	187	1.25	1.25	1.85	1.85

\* Significant effect at the .001 level by *F* test.

The estimated components total 3.19 for the high authoritarians and 3.24 for the low authoritarians, yielding 1.79 and 1.80 as estimated standard deviations of the two distributions of self-ratings. Evidently high and low authoritarians do not differ in their tendency to give extreme self-ratings. These standard deviations are slightly larger than those for picture ratings, indicating a slight tendency for *Ss* to give themselves more extreme ratings than they give strangers.

In self-ratings, variance due to traits may be regarded as reflecting uni-



formity of self-images. This variance component was very large for both groups, 59 per cent of the total variance for high authoritarians and 42 per cent of the total variance for low authoritarians. This is not surprising in view of the objective relative homogeneity of the Ss, all male university undergraduates. It is notable, however, that the Ss showed more agreement on this shared self-image than in their perception of others' traits.

In self-ratings, as in picture ratings, the variance due to traits is much greater for the high authoritarians than for the low authoritarians. Furthermore, the variance due to the traits X Ss interaction, the residual variance, is reduced for the high authoritarians relative to the low authoritarians, which implies that they have a more stereotyped self-image.

In an analysis in which the self-ratings for the two groups were pooled, a groups X traits interaction significant at the .025 level was obtained.

TABLE 3  
RATING MEANS

Trait	Picture ratings		Self ratings	
	High authoritarians	Low authoritarians	High authoritarians	Low authoritarians
Dominating	4.49	4.30	4.28	4.50
Imaginative	3.72	3.79	5.50	5.44
Sexually intense	4.50	4.18	4.56	5.28
Hostile	4.59	4.25	3.00	3.45
Manly	3.91	3.69	5.11	5.06
Lucky	3.44	3.57	3.83	3.78
Has loose morals	4.08	4.00	2.67	3.50
Good	3.46	3.75	5.33	5.22
Feeble	2.81	2.98	1.89	2.22
Knows all the angles	4.39	3.86	4.61	3.28
Conforms to society	3.77	4.00	5.28	4.44
Feminine	3.41	3.57	1.44	1.78

Table 3 shows the mean self-ratings on the various traits by the two groups. The differences between the groups on these means (as on the picture-rating means) seem harmonious with earlier work on authoritarianism. The high ratings the high authoritarians give themselves on "manly" and "knows all the angles," with very low ratings on "feeble" and "feminine," are proclamations of their adequacy in the jungle-world (1, pp. 393, 411), perhaps denials of their fear of others. The high ratings they give themselves on "good" and "conforms to society," with relatively low ratings on "hostile," "has loose morals," and, perhaps, "dominating" and "sexually intense," are proclamations of their virtue (1, pp. 395, 429), and perhaps denials of their hostility toward others.

## D. DISCUSSION

The one major divergence of the rating behavior of the high authoritarians from that of the low authoritarians seems to be indiscriminate condemnation and fearfulness of the strangers, with complementary insistence that they themselves are virtuous and able. This finding suggests that the essence of authoritarianism is general, persistent, and denied fear of and hostility toward others.

Such a paranoid-like characterization of high authoritarians underlay the concepts of potential fascism and ethnocentrism in *The Authoritarian Personality*, and it seems to have explanatory power for the results of other work on ethnocentrism and its correlates.

A high authoritarian will fear the author of the elegantly if ambiguously expressed opinions on questionnaires such as the F-scale. He is likely to placate this author by agreeing with the opinions, introducing a component in his score due to acquiescence as well as one due to content (5, 12).

His fear of *E* may lead to disorganized or defensive behavior (intolerance of ambiguity or complexity, or rigidity), particularly if *E* heightens his fear by making the task ego-involving, threatening to evaluate him (2, 4, 11).

His fear of and hostility toward other *Ss* may result in inadequate social interactions or social intelligence (6).

In some experimental situations, or for some *Es*, or for some high authoritarians (the psychopathic or aggressive as opposed to the conventional or submissive ones (1, 9)), the high authoritarians' hostility toward others may predominate rather than their fear. This complication could well lead to many of the confusing and contradictory results in the literature on authoritarianism.

## E. SUMMARY

High and low authoritarians (as measured by the California F-scale) rated pictures of strangers on personality traits and subsequently rated themselves on the same traits.

The high authoritarians exhibited general fear, suspicion, and moralistic condemnation of the strangers, relative to the low authoritarians, while glorifying their own virtue and ability.

The high and low authoritarians showed little or no differences on measures of tendency to dichotomize, rigidity, acquiescence, and other aspects of behavior. It was suggested that differences on such variables found in other situations are not central to authoritarianism but depend on the high authoritarians' fear and suspicion of others.

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## ATTRIBUTED CHARACTERISTICS OF LIKED AND DISLIKED PERSONS\*

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### A. INTRODUCTION

In everyday experience, people form impressions, develop attitudes and emotional dispositions toward a host of characteristics of persons with whom they interact or about whom they have some knowledge (1, 2). Investigation of such impressions, attitudes, and emotional dispositions is obviously important, for they steer the behavior of the man-in-the-street in his relations to others. Studies on the attribution of motive have shown that one of the conditions affecting attribution is the observer's attitude (positive or negative) toward the performer of the act (3, 4). In order to study further the differential effects of a negative or a positive attitude toward the performer of an act, it seems desirable to proceed with an investigation of the phenomenal impressions of liked and disliked persons. How does the observer feel or think that liked or disliked persons will behave in certain situations? The personality characteristics are attributed to liked and disliked persons. The object of this preliminary investigation is to obtain answers to these questions. We shall not be concerned with either the problem of the accuracy with which an observer can judge the characteristics of others or the genesis of feelings of like and dislike.

The categories of interest in this report concern impressions of social cohesiveness, physical appearance, expressive behavior, talents, need states, motivational structure, ego structure, emotionality, permanence of personality, and intentionality of behavior. We recognize that these categories, although apparently rooted in experience, can be replaced by others. Our immediate aim is to define a series of categories which will enable the investigation to move along. A partial justification for this pragmatic attitude lies in the fact that at the present time no inclusive theoretical scheme for categorizing the outcomes or correlates of social interactions exists. In

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<sup>1</sup> Paper read before the 1957 meeting of the American Psychological Association.

<sup>2</sup> In planning this investigation the author has profited from discussions with Dr. M. W. Horowitz, Queens College, and with Dr. L. Wertheimer, Wellesley College.

relation to the above categories, 22 items of behavior, defining the same number of predictions, were specified. Relative to a liked person, a disliked person phenomenally tends: to have fewer friends (Item 1)<sup>3</sup>; to elicit less agreement for his opinions (Item 2); to be less interested in travel (Item 3); to keep a personal worry to himself (Item 4); to be less handsome (Item 5); to be less humorous (Item 6); to be less intelligent (Item 7); to be more hostile (Item 8); to have weaker needs for receiving love (Item 9), for expressing love (Item 10), and for forgiveness (Item 11); to be more controlled by a single motive (Item 12); to be more influenced by prestige and status factors (Item 13); to be less able to modify or postpone pursuit of a major goal (Item 14); to eat more when hungry (Item 15); to feel a toothache more acutely (Item 16); to possess a personality that cannot be as readily changed (Item 17); to possess a personality more determined by hereditary factors (Item 18); to be more personally responsible for a "nervous breakdown" (Item 19); to have the source of insomnia placed in his personality (Item 20); to be seen as himself placing the source of insomnia in the environment (Item 21); to spend more time in thinking about his goals in life (Item 22).

#### B. PROCEDURE

All of the items, with the exception of two, were phrased so as to be amenable to a rating scale technique. Items 20 and 21 were given in multiple choice form, with the same four alternatives for both. The items were mimeographed on three pages; neither the pages nor the items were numbered. This made it possible to order the three pages in various combinations (six) in order to get partial control over possible interdependence of item responses. All subjects were given the same three pages; however, half received "dislike" instructions, the other half "like" instructions. The critical part of the instructions designed to evoke an attitude of dislike read as follows:

Think of all the persons you have *disliked*. Even though you may find it difficult to remember all persons you have *disliked*, you probably have definite feelings and impressions about their characteristics and their ways of behaving. On the basis of such feelings and impressions you are to place a mark anywhere along the line for every item.

The "like" instructions were identical except for the substitution of the word *liked* for the word *disliked*. Copies of the two forms were alternately distributed to 80 students of an elementary psychology course. About 10 to 15 minutes were required to complete the task.

<sup>3</sup> The numbering of the items corresponds to the numbering of the items in the table and in the appendix.

## C. RESULTS

In the table the two means associated with each item (according to "like" and "dislike" instructions) are given. Measurements of ratings were always made from the extreme left end of a 90 mm. line as the zero point. The four alternatives of the two multiple choice items were assigned numbers 1 through 4 and the means computed. For each pair of means the subtraction was performed so that a positive difference would be obtained if a given prediction were verified. Only three items, Nos. 4, 18, 22, yielded results contrary to expectation. Employment of the sign test shows that the set of 22 predictions is confirmed at the 1 per cent level of significance.

TABLE 1  
MEAN RATINGS

Item No.	Like	Dislike	Item No.	Like	Dislike
1	50.8	23.5	12	29.8	50.8
2	49.5	31.3	13	47.3	63.3
3	54.0	36.0	14	36.8	58.5
4*	37.5	45.3	15	37.3	35.3
5	40.8	48.8	16	45.0	38.5
6	26.0	55.8	17	34.3	21.8
7	24.3	45.5	18*	55.0	59.8
8	49.5	66.0	19	39.8	41.3
9	42.8	34.8	20	3.2	3.6
10	42.0	53.0	21	3.0	2.4
11	25.3	38.5	22*	23.5	43.0

\* The three starred items yielded results contrary to expectation.

In order to get some control over possible interdependency of responses a random sample of 8 of the 22 items was selected. These items were singly administered to 160 additional subjects (20 subjects per item). The new results were in complete agreement with the original results. Confidence is further increased by the consistent results of preliminary investigations in which items were assigned in varying order and number and under different instructions. In the final one of these investigations, involving 250 subjects, responses to items were to be given on the basis of an imagined personality who was *sincere, tactful, sympathetic, cooperative, self-confident*, or who was *cunning, cynical, selfish, untrustworthy, blunt*. Half the subjects received one set of traits, the remainder received the other set. The instructions were successful in eliciting either a positive or a negative attitude toward the imagined personality. In general, wider differences between paired means were obtained than in the present investigation. However, a change in the instructions seemed desirable since it could be claimed that the rated impressions were contained in or could be directly inferred from the traits themselves. Such an interpretation is now excluded by the deliberately vague instructions of the present investigation.



TABLE 2<sup>4</sup>

1. In comparison with the average person, he has: fewer friends, more friends (L).
2. If he expresses an opinion on a controversial subject: I will most likely disagree with him, I will most likely agree with him (L).
3. In comparison with the average person, he is: less interested in visiting a foreign country, more interested in visiting a foreign country (L).
4. When confronted with a personal worry: he is more likely to keep it to himself than the average person, he is more likely to tell others about it than the average person (L).
5. In comparison with the average person, he is: more handsome (L), less handsome.
6. In comparison with the average person, his sense of humor is: above average (L), below average.
7. In comparison with the average person, he is: above average in intelligence (L), below average in intelligence.
8. If he is waiting on the right corner for a bus and the driver accidentally passes him by, he will feel: little or no anger toward the driver (L), considerable anger toward the driver.
9. In comparison with the average person, he feels: a strong need for someone to love him (L), little or no need for someone to love him.
10. In comparison with the average person, he feels: little or no need to love someone, a strong need to love someone (L).
11. If he does something wrong: he will feel a greater need for forgiveness than the average person (L), he will feel less of a need for forgiveness than the average person.
12. In comparison with the average person, his actions tend to be influenced by: many and different motives (L), by a single motive only.
13. In comparison with the average person, social and economic prestige are of: little importance to him (L), major importance to him.
14. In comparison with the average person: he can easily modify or postpone pursuit of a major goal (L), he cannot modify or postpone pursuit of a major goal.
15. When hungry, he probably will eat: more than the average person, less than the average person (L).
16. If he has a toothache, he will feel pain: more acutely than the average person, less acutely than the average person (L).
17. In comparison with the average person, his personality: cannot be changed easily, can be changed easily (L).
18. In comparison with the average person, his personality is: more strongly influenced by inborn factors, more strongly influenced by environmental factors (L).
19. Suppose that he has a "nervous breakdown." I feel that he is: not personally responsible because the reasons for a "breakdown" were probably beyond his control (L), completely responsible because he probably failed to take the necessary steps to prevent a "breakdown."
20. If he suffers from insomnia, how would you explain this difficulty?: family obligations are responsible (L); people, in general, place too much pressure on him; some physiological factor is responsible; something within his personality is responsible.
21. If he suffers from insomnia how will he explain this difficulty to himself? He is likely to think that: family obligations are responsible; people, in general, place too much pressure on him; some physiological factor is responsible; something within his personality is responsible (L).
22. In comparison with the average person, he spends: more time in thinking about what he wants out of life, less time in thinking about what he wants out of life (L).

<sup>4</sup> In order to conserve space, the 90 mm. lines and the actual format of the items have been respectively omitted and modified. The two descriptive phrases for each 90 mm. line are given successively, following the colon and separated by a comma.

## D. DISCUSSION

This study provides evidence for the usefulness of the concept of *unit formation* (2) since it can simply and successfully account for the results of many of the items. For example, in Item 6, *sense of humor* is a socially desirable characteristic and it thus is connected with a liked, rather than a disliked, person. However, Items 2, 12, 13, 14, and 17 cannot be readily coordinated with a socially desirable-undesirable dimension and, consequently, additional principles are necessary.

For Item 12 equally plausible arguments can be advanced to support the attribution of either a single or a plurality of motives to both liked and disliked persons. The main reason underlying the prediction for this item is that a disliked person is seen as having a more compact and a more visible personality than a liked person. As a consequence, the actions of a disliked person would be linked to central regions and thus become subject to the influence of a single motive. The idea of a greater degree of compactness was also at the basis of predicting that a disliked person would be rated as more resistant to a change in personality. A direct linkage of this characteristic with a given attitude toward the person is insufficient to explain the results since resistance to change can be as readily associated with a disliked person (obtuseness) as with a liked person (steadfastness of purpose). As a corollary to this item it was predicted that a disliked person would be assigned a greater degree of genetic determination than would a liked person (Item 18). This prediction, however, was not borne out.

An interpretation in terms of *unit formation* can be coextensive with other principles as well. Some of the predictions were based on the idea that a liked person tends to be seen in a reciprocal relation with the social environment and willing to interact with it in a shared way. Degree of interest in travel (Item 3) was intended as an indirect measure of this idea. The results of this item, however, also can be interpreted in terms of *unit formation*; travel abroad is a desirable characteristic for many people in our culture. Items 9, 10, and 16 can be similarly analysed. For example, for Items 9 and 10, a disliked person is attributed weaker needs for receiving

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The first phrase was centered at the left end and below the line, the second phrase at the right end and below. The parentheses for each alternative of Items 20 and 21 have been omitted. The parenthesized letter "L" which appears along with some phrase denotes the direction of the predicted mean rating for "like" instructions; the predicted mean rating for "dislike" instructions, not herein indicated, is in the opposite direction. The instructions, omitted here, are to be found in the body of the article. The items were recorded when actually distributed to subjects. The above arrangement of the items will make it easier to relate them to the categories of interest.



and expressing love because he tends to be seen as cut off from the environment. Moreover, it would not be inconsistent with the principle of reciprocity to advance the idea that a liked person will be seen as behaving in relation to internal standards whereas a disliked person's behavior will be seen as more readily influenced by external standards. Consequently, the prediction for Item 13 was that considerations of social and economic prestige would be seen as more important for a disliked person.

Several implications for 'mental hygiene' should be indicated. The effect of an attitude of like or dislike will change the social distance between the observer and the person who is the object of the attitude. If a disliked person is seen as having little or no need to receive and to give love, then individuals in the psychological environment of that person will not be strongly motivated to enter into a relationship which would decrease distance. If a disliked person is seen as having little or no need for forgiveness, then forgiveness will not be readily extended to him. If a disliked person is seen as directly responsible for the development of personal problems, then he will not receive much support from this environment. Ultimately, complete analysis of such considerations will depend on the accuracy of the raters' responses. It may very well be that disliked persons actually possess the characteristics ascribed to them, characteristics which may even be responsible for the genesis of the feelings directed to them. It is doubtful, however, that this would be generally the case since a person who is disliked by some individuals is often liked by others. The appearance of "distortion effects" in interpersonal relations, which is an implication of our results, is obviously not a new phenomenon in psychology.

#### E. SUMMARY

The problem of the attribution of various behaviors and personality characteristics as a function of the attitudes of like and dislike was investigated. Eighty subjects gave their impressions, chiefly by a rating scale technique, on 22 items of behavior. Half the subjects received instructions designed to elicit the recall of disliked persons, the other half of liked persons. The results, which were statistically significant, were discussed both in terms of unit formation and the heuristic principles underlying the formulation of the predictions.

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## MANIFEST HOSTILITY LEVEL AND HOSTILE BEHAVIOR\*

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### A. INTRODUCTION

Recent investigations have pointed to a number of potential difficulties in the prediction of hostile behavior from responses to a personality test. Subjects (Ss) who admit to characteristically frequent and strong feelings of anger on such a test (i.e., whose manifest hostility level is high) do not necessarily exhibit intense hostile behavior in interpersonal situations. Indeed, the results of two experiments suggest that, among middle class college students at least, manifest hostility level is *negatively* correlated with the amount or intensity of hostile behavior displayed after anger is aroused.

In the first of these studies, Thibaut and Coules (9) asked each of their Ss, organized into two-man groups, to write down their initial impressions of their partners. On the basis of a content analysis of these "first impressions," the Es classified the Ss as either initially friendly or initially hostile toward their partners. Since the two group members had not communicated with each other before these sketches were written, it is likely that this initial hostility level is a manifestation of a generalized attitude toward others. That is, it is indicative of each S's characteristic level of manifest hostility. In the next phase of the experiment the two Ss wrote messages to each other. Anger was aroused toward S's partner by manipulating the nature of the notes ostensibly sent by him. After this instigation to aggression, the initially hostile Ss communicated a significantly *smaller* amount of aggression to their partners than the initially friendly Ss. In the more recent experiment, Hokanson and Gordon (4) administered a scale of "Manifest Hostility" to their Ss. Those scoring at the extreme ends of this scale were placed in either a situation designed to arouse relatively strong hostility, or in a low arousal situation, and then allowed to express aggression in fantasy (to TAT pictures), and in overt behavior. Relative to the comparable Ss in the "low arousal" condition, there was a significant tendency for the "strongly aroused" Ss with low manifest hostility scores to express more hostility on the TAT,

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while the similarly "aroused" high manifest hostility Ss gave fewer aggressive responses. No significant relationships were found in the overt behavior situation.

The present study is an attempt to replicate the above results. Ss are classified as either high or low in manifest hostility on the basis of their answers to the scale utilized by Hokanson and Gordon and then subjected to experimental treatments similar to that employed by Thibaut and Coules. According to the results of the earlier investigations, high manifest hostility Ss will increase less in their overt hostility toward another after being angered by him than Ss low in manifest hostility.

### B. PROCEDURE

As part of another experiment, two Ss, both male or both female, were brought together ostensibly for a study of the formation of "first impressions." The two Ss were not given an opportunity to talk to each other at this time. After receiving the instructions and a brief description of their task, they went into separate cubicles where they indicated their impressions of their partners on the first questionnaire. Among other things, this questionnaire required that S rate his partner on 13 ten-point rating scales. The responses to six intercorrelated items on this form were summed together to yield the S's initial hostility score. One of the items reads, "Would you admit him (her) into your circle of close friends?", with the answers ranging from "Definitely yes" (score = 1) to "Definitely no" (score = 10).

The Ss then wrote two notes to each other at five-minute intervals in which they described themselves. They were to utilize their partner's self-descriptions in evaluating him on the second questionnaire. E substituted previously constructed notes for the notes actually written in order to produce the experimental conditions. The notes received by the Ss in the *Hostility-Arousal condition* indicated that the partner had little regard for the University and most of its students, while the Ss in the *Non-Hostility-Arousal condition* were led to believe that the partner liked life at the University, and was fairly active in student affairs. Following this, Ss again indicated their impressions of their partners on a second form of the questionnaire. The same six items used previously were employed in assessing the Ss' subsequent level of hostility toward their partners.

Forty-two of the Ss participating in the experiment had taken the manifest hostility scale (7) utilized by Hokanson and Gordon four to eight weeks earlier. Dichotomizing the distribution of scores on this scale as close to the median as possible, it was found that a factorial design could be set up that



had proportional cell frequencies. (The  $N$ 's in each condition are given in Table 1.)  $S$ s are classified in this design in terms of (a) hostility arousal condition and (b) manifest hostility, with the dependent variable consisting of the sum of responses to the six hostility items in Questionnaire 1 and again in Questionnaire 2. The  $S$ s were volunteers from introductory psychology classes at the University of Wisconsin. Nine of the 22 "non-aroused"  $S$ s are males, while the sex ratio in the "aroused" condition is five males to 15 females.

### C. RESULTS

The mean hostility level on each of the questionnaires in each of the four conditions is reported in Table 1, with the results of the analysis of variance given in Table 2. The highly significant interaction of "hostility-arousal treatment by questionnaires" shown in the latter table attests to the success of the experimental manipulations. As can be seen in the first table, there is no significant difference between the means of Questionnaires 1 and 2 in the "non-arousal" condition when both types of  $S$ s are combined. However, over all  $S$ s the mean hostility level on Questionnaire 2 in the "aroused" condition is significantly greater than the mean level before arousal in this condition and also greater than both hostility scores in the "non-arousal" condition.<sup>2</sup> We may conclude that the hostility-arousal treatment was generally successful in increasing the degree of the  $S$ s' unfriendliness toward their partners.

Table 1 also presents data supporting the validity of the manifest hostility scale. Combining all conditions, the high manifest hostility  $S$ s exhibit a significantly greater degree of hostility toward their partners on Questionnaire 1 than the low manifest hostility  $S$ s. However, as is indicated in Table 2, the latter initially friendly  $S$ s, over all experimental conditions, display a significantly greater increase in unfriendliness toward their partners after receiving the communications from them. This significant "manifest hostility by questionnaires" interaction is consistent with the present study's major hypothesis.

Table 1 provides further information relevant to this hypothesis, and suggests that the above interaction is not due to a statistical regression in any simple fashion. In the *Non-Hostility-Arousal condition* the high manifest hostility  $S$ s, after communicating with their partners, become significantly friendlier toward them on Questionnaire 2, while there is no change in the mean ratings made by the low manifest hostility  $S$ s. In contrast, both types

<sup>2</sup> The post-analyses of variance condition comparisons utilized the Duncan multiple range test (3) with the .05 confidence level accepted as the level of significance. Each condition was given an  $N$  of 10 for these comparisons.

TABLE 1  
MEAN HOSTILITY-TOWARD-PARTNER SCORE

	Non-hostility arousal		Hostility arousal	
	High Man. Host. Ss	Low Man. Host. Ss	High Man. Host. Ss	Low Man. Host. Ss
N	11	11	10	10
Score on Quest. 1:	22.6	18.5	25.4	19.1
Score on Quest. 2:	16.3	18.3	36.6	34.8

TABLE 2  
ANALYSIS OF VARIANCE OF HOSTILITY-TOWARD-PARTNER SCORES

Source	DF	Mean squares	F ratio
1. Hostility arousal	1	2113.36	24.56
2. Manifest hostility	1	128.76	—
3. 1 x 2	1	47.30	—
4. Raters	38	86.04	
5. Questionnaires	1	457.33	15.56
6. 1 x 5	1	1472.82	50.10
7. 2 x 5	1	149.34	5.08
8. 1 x 2 x 5	1	3.29	—
9. Residual	38	29.40	

of Ss become significantly more hostile toward their partners on Questionnaire 2 in the "arousal" condition.<sup>3</sup> As expected, this increase is greater (though not significantly so) in the case of the low manifest hostility Ss. [The results of the Thibaut and Coules (9) and Hokanson and Gordon (4) studies suggest, nevertheless, that this difference is reliable.] Even though these latter Ss initially had been significantly friendlier toward their co-workers than the high manifest hostility Ss, once angered there was no difference in the intensity of the hostility displayed by the two groups of Ss. The anger exhibited by the low manifest hostility Ss increased to the level exhibited by the high manifest hostility Ss.

A further analysis was undertaken in an attempt to obtain some insight into the meaning of a given manifest hostility score. In the course of the original experiment half of the Ss responded to an adjective check list by indicating which of the adjectives best characterized themselves. This was done at the end of the experimental session but before E explained the nature of the deceptions he had employed. Ten college students, five of each sex, later classified these adjectives as either "favorable" or "unfavorable." Utilizing only those adjectives whose classification was agreed upon by at least seven

<sup>3</sup> The Duncan test does not necessarily require a significant preliminary F-ratio.

of the judges, a total "favorableness of self-description" score was obtained by summing all the favorable adjectives said to apply to one's self with the number of unfavorable adjectives rejected as not applying. These data were available for 22 of the present Ss. The Pearson product-moment correlation between this self-description measure and the manifest hostility scale is  $-.76$  ( $p = .01$ ). A scatter plot reveals that there is no significant relationship between the favorableness of self-description scores and the extent to which the Ss increased in unfriendliness toward their co-workers from Questionnaire 1 to Questionnaire 2. Thus, it is not likely that the self-descriptions were significantly affected by the Ss' ratings of their partners.

#### D. DISCUSSION

The interpretation of the present results depends upon assumptions concerning the nature of the differences between the high and low manifest hostility Ss. If it is assumed that the high manifest hostility Ss possess either a stronger aggressive drive or a greater predisposition toward aggression than the low manifest hostility Ss, we must introduce an inhibiting mechanism to account for the relatively small increase in unfriendliness displayed by the former Ss after arousal. This type of interpretation would maintain that a greater level of aggressive drive is aroused within the high manifest hostility Ss, but that this in turn produces strong aggression-anxiety which inhibits hostile behavior. The low manifest hostility Ss are not as strongly angered, and, therefore, do not develop strong aggression-anxiety. Thus, they are more likely to express hostility freely. If this explanation is correct, the unfavorable image of themselves possessed by the high manifest hostility Ss might mean that they are prone to feelings of guilt and anxiety, particularly if they behave in a socially disapproved manner.

There is some evidence in support of this line of reasoning. Two investigations suggest that even socially sanctioned hostile behavior may produce aggression-anxiety within middle class college students (5, 8), while the results of a more carefully controlled laboratory experiment indicate that the arousal of a socially disapproved drive in this type of subject ordinarily leads to the suppression of outward manifestations of the drive (2). In general, then, there is likely to be a negative correlation between the strength of a disapproved drive aroused within college students and the intensity or amount of behavior related to this drive exhibited by them. This presumably occurs because the strong drive results in high level of anxiety. The manifest hostility Ss may have been more strongly aroused than the low scoring Ss, and thus, were more likely to inhibit the socially disapproved acts.



However, there is at least one difficulty that must be overcome by this type of explanation: the high manifest hostility *Ss* became significantly friendlier toward their partners after exchanging the "non-arousal" notes with them, while there was no such change in the case of the low manifest hostility *Ss*. This difference could be taken as indicating that the low manifest hostility *Ss* have a stronger aggressive drive than the high manifest hostility *Ss*, but for some reason inhibit the admission of these feelings. This inhibition, in turn, may be indicative of a defensive inability to become too friendly with others, particularly on short notice.

The present data also can be interpreted employing "expectancy" constructs. In this case it must be assumed, first, that affective reactions are likely to result from unexpected events, and second, that the manifest hostility scale is positively correlated with *S*'s perceived probability of receiving hostility from others. (That is, as the unfavorable self-image of the high manifest hostility *Ss* might suggest, the scale measures the extent to which *Ss* expect to be frustrated, even in interpersonal situations.) Thus, when the *Ss* in the "non-arousal" situation received relatively friendly notes from their partners, the high manifest hostility *Ss* were more surprised than the low manifest hostility *Ss*, and consequently, exhibited a greater change toward friendliness. Similarly, the low manifest hostility *Ss* were more surprised than the high scoring *Ss* as a result of the hostility-arousing notes in the "arousal" condition, and reacted more adversely to these communications.

These widely differing interpretations illustrate some of the difficulties inherent in the use of a personality test to predict later behavior; we cannot always say what stimuli give rise to a particular set of test responses. For example, *Ss*' verbal responses in the test situation may be influenced by a desire to avoid displeasing either one's self or *E*, particularly if the motives involved are socially relevant, and this influence may come about even if the test utilizes fantasy productions (1, 2). As the present study has shown, *Ss* who describe themselves as being relatively friendly toward others may actually exhibit more unfriendliness than people who have a high manifest hostility level.

#### E. SUMMARY

Two earlier studies (4, 9) indicated that *Ss* who admit to characteristically strong feelings of anger (i.e., whose manifest hostility level is high) exhibit a smaller increase in the intensity of their hostile behavior after anger is aroused than *Ss* low in manifest hostility. The present study attempted to replicate these findings. Two *Ss*, after privately indicating their initial impressions of each other (on Questionnaire 1), exchanged written messages. By

substituting previously constructed notes for these messages, *E* aroused hostility toward *S*'s partner in half of the *Ss*. Following this brief communication period the two *Ss* again rated each other on the questionnaire scale of friendliness-unfriendliness (in Questionnaire 2).

*Ss* who previously had been assessed as high in manifest hostility displayed significantly more hostility toward their co-workers on Questionnaire 1 than the low hostility *Ss*, supporting the validity of the manifest hostility measure. However, combining both experimental conditions, the low manifest hostility *Ss*, as predicted, had a significantly greater increase in unfriendliness toward their partners following the exchange of communications than the high manifest hostility *Ss*. Further analyses and the implications of these differences are discussed.

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## A NOTE ON CHANGING TOWARD LIKED AND DISLIKED PERSONS\*

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### A. PROBLEM

The general problem concerns the processes involved in changing negative and positive attitudes directed to persons. What are the factors which transform a liked person into a disliked person, or conversely? In order to gain some relevant information in answer to this question we specify, on a phenomenal level, the particular hypothesis of this note: *It is more difficult to change a disliked person into a liked person than it is to change a liked person into a disliked person.* The rationale for this hypothesis lies in the following considerations. (a) A positive act is less salient and less compelling than a negative act. An ostensible positive act performed by a liked person is not as outstanding as a negative act, and it may even pass unnoticed. A negative act performed by a liked person thus produces a force which tends to change the person in a negative direction. On the other hand, the attribution of sinister or similar motives will divest the positive acts performed by disliked persons of their potential for positive change. Moreover, negative acts performed by disliked persons are more apt to be noticed than are positive acts performed by liked persons and, consequently, the feeling of disliked is strengthened. (b) A disliked person gives the impression of possessing a more 'dense' and a more 'compact' personality than does a liked person. That which is more dense and more compact will offer greater resistance to change. (c) The negative characteristics of disliked persons are seen as more deeply rooted in the personality than are the positive characteristics of liked persons. Consequently, the former are more resistant to change than the latter. (d) If we suppose a transformation of a liked into a disliked person, or conversely, then the following obtains: if the change is from like to dislike then negative environmental forces impinging upon the liked person would be judged responsible; if the change is from dislike to like then a restructuring of the outlook of the disliked person would be judged responsible. A restructuring of outlook by a disliked person would be considered more difficult to achieve than the resistance a liked person can

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offer in warding off negative impacts from the environment. (e) A liked person is easier to change since he is in a closer relationship with those for whom he is an object of like. Consequently he has a greater opportunity to hurt or to perform negative acts which would tend to transform him into a disliked person. On the other hand, a disliked person occupies a more insulated position in relation to those for whom he is an object of dislike and, even when performing possibly positive acts, has less of an opportunity for altering his given impression. (f) In a previous investigation it was shown that disliked persons were rated as more difficult to change than were liked persons (1).

### B. PROCEDURE

Two forms of a questionnaire (see Table 1) were randomly distributed

TABLE 1

We wish to study the possibilities of changing various types of personalities and your cooperation is desired. In what follows, it is possible that you may feel that the situation is rather artificial or even vague. Since this study is related to the practical issues of dealing with people you should do the best you can and answer all items, without raising any questions. We desire your feelings and impressions as much as possible. Do not sign your name to this sheet; answers are anonymous.

Mr. A, who is 30 years old and a high school graduate of average intelligence, has the following characteristics dominant in his personality: *sincere; unselfish; trustworthy; sympathetic; tactful*. We are going to consider the possibility of a change occurring in Mr. A's personality so that the following opposite characteristics become dominant: *insincere; selfish; untrustworthy; unsympathetic; tactless*.

For each one of the following items, check the alternative which best represents your feeling or impression.

1. Under the usual conditions of life, I believe that such a change in his personality
  - ☐ cannot occur
  - ☐ can occur but only with the greatest difficulty
  - ☐ can occur but only with great difficulty
  - ☐ can occur with moderate difficulty
  - ☐ can occur without much difficulty
  - ☐ can occur with no difficulty at all
2. I feel that a single unfavorable dramatic experience
  - ☐ cannot produce such a change
  - ☐ can produce such a change but only with the greatest difficulty
  - ☐ can produce such a change but only with great difficulty
  - ☐ can produce such a change with moderate difficulty
  - ☐ can produce such a change without much difficulty
  - ☐ can produce such a change with no difficulty at all
3. Suppose that Mr. A is placed in the most unfavorable circumstances possible. I feel that the following amount of time is necessary to produce an opposite type of personality:
  - ☐ more than 20 years
  - ☐ 10 up to 20 years
  - ☐ 5 up to 10 years
  - ☐ 2 up to 5 years
  - ☐ 6 months up to 2 years
  - ☐ less than 6 months

to 81 students of elementary psychology at the beginning of the term. The questionnaire contained a brief and deliberately vague description of a hypothetical person that initially would elicit an attitude of like or dislike. The subjects were instructed to consider such a person changing from one type of personality to the opposite type and, then, to check their impressions on each of three items. The items were assumed to be indices of the difficulty of effecting such a change in personality. Only a few minutes were required to complete the task without any apparent difficulty.<sup>1</sup>

### C. RESULTS

For statistical purposes the six alternatives for each item were assigned the numbers five (greatest difficulty of change) through zero (least difficulty of change). The total score for each subject comprised the sum of the ratings for the three items. The two mean scores, corresponding to the two forms, were 7.7 (like to dislike) and 9.6 (dislike to like). The value of  $t$  was 2.64 (79  $df$ ), a result which is significant at the 1 per cent level. Each of the three items discriminated between the two forms in line with the hypothesis. These results are in accord with those of preliminary investigations (153 subjects) in which different traits were involved as well as different numbers of traits. We conclude that the initial hypothesis is confirmed.

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<sup>1</sup> The alternative form (dislike to like) was identical except for the following changes: the two sets of traits in the description of Mr. A were reversed, the word *favorable* was substituted for the word *unfavorable* in the stubs of Items 2 and 3.

## BOOKS

Now that there is a special APA journal completely devoted to the publication of book reviews, it is no longer necessary that other journals emphasize such publication. It has always been our conviction that book reviews are a secondary order of publication unless they carry information that is equally important as the book. However, the publication of book titles is a very important service, and we shall continue to render that service.

In any given issue of this journal, we may continue to publish one or more book reviews, but we do not consider such publication a major function of this journal. In line with this policy, we can no longer pay for such manuscripts.

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## PICTORIAL DEPTH PERCEPTION IN SUB-CULTURAL GROUPS IN AFRICA\*

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### A. INTRODUCTION AND PROBLEM

Protocols from a picture projection test administered in 1957 to a group of 85 Bantu factory workers of different tribal origins, educational levels, and degrees of urbanisation contained interesting perceptual information. The test, designed to obtain information on aspirational levels in the occupational situation, consisted of 14 pictures. These pictures were unambiguous, half-tone, graphic representations of a variety of situations in which the traditional Bantu tribal, family, material culture, and spiritual values were contrasted with western urbanised values and cross-cultural tendencies displayed in educational opportunity, higher living standards, greater purchasing power, social disruption, and reorientation. For two of these pictures, unconventional perception was apparent in 20 protocols. One of these pictures was drawn to represent the home-coming of the migrant industrial worker. The scene contained the figures of an elderly couple seated on the ground. In the background was a thatched circular hut, with the figure of the worker clad in overalls, arms akimbo, superimposed upon it. Seven protocols referred to a winged being, a devil or an angel. By accident, the artist in superimposing the foreground figure on the hut, had placed the ragged thatched roof of the hut in such a manner that an observer, who did not perceive depth in the picture, would see the thatch as feathers or wings sprouting from the worker's back just above his shoulders. His posture, with arms akimbo, aided this interpretation. The second picture was intended to re-

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<sup>1</sup>The writer is indebted to S. Biesheuvel, Director of the National Institute for Personnel Research, Johannesburg, for helpful criticism; to Institute staff M. S. Dlodlo, P. Morgan, J. Nelson for assistance in testing; M. Elder, E. Gotsman, R. S. Hall, H. Linhart for statistical computation and advice; to Y. Glass for access to T.A.T. protocols. H. Duncan constructed the 11 test pictures and the models, which were photographed by Graphic Arts Division, South African Council for Scientific and Industrial Research. Testing facilities were granted by Durban Roodepoort Deep Mine, Ltd., by Central Inspectorate of Bantu Schools, Johannesburg, and by the headmaster of St. Peters Preparatory School, Johannesburg.

present a demagogue haranguing a group of workers. As a dominating figure, he was placed above the workers, and in the background to lend atmosphere to the picture, the artist included a long factory-like building with three tall smoking chimneys. Again, by accident, the demagogue's outstretched hands were positioned just above the tops of two of the chimneys. Thirteen protocols referred to the madman who had climbed up to the top of the houses and was warming his hands at the smoke. This interpretation was correct, given a two-dimensional pictorial perception. In 20 protocols candidates responded to a manifest pictorial content alien to the intended structuring. In turn this response was associated with a latent projective content outside the test's reference frame. This means that the perceptual stimuli were not equivalent for all candidates, nor were they equivalent for candidates and tester, and hence responses were inappropriate experimentally. It may be argued that any projective response is relevant. This may be true to a point. In a pure cultural study, all projective responses may contribute data to the total psychological picture of the culture. But in cross-cultural investigations where the structuring of the projective pictorial material is important, irrelevant responses minimise the usefulness of the technique.

Psychologists, working in cultures other than their own, have encountered methodological problems in the construction and interpretation of psychological tests and data. In the cognitive field, Biesheuvel (2, 4), Verhaegen and Laroche (17) have commented upon the conceptual incompatibility for use with African culture of tests designed in a western culture. On anthropological grounds Leblanc (11) and Ombredane (13) voice similar criticism of the use of projective test material with African groups. Adcock and Ritchie (1), testing Maori and White samples on the Rorschach test conclude that cultural differences necessitate the re-evaluation of cards and scoring symbols. Such criticism is directed at conceptual and anthropological incompatibility, and in the case of projective techniques is generally concerned with the latent content of the test material. Dennis (7) stresses the importance of a knowledge of the perceptual habits of a cultural group as a means of evaluating projective data. Responses occurring within the framework of perceptual habits should not be interpreted as purely projective. Biesheuvel (5) recommends that the perceptual habits of African samples should be investigated prior to the construction of projective tests and also as a means of throwing light on the data obtained by such techniques.

These findings and discussions serve to focus attention on the role of perceptual habit in the construction and interpretation of psychological tests and data. But there are implications outside this narrow, technological field.



Western culture is book-learned, characterised by dependence upon the written word, illustration, diagram, photograph. Visual presentation is a common mode in the classroom, in the factory, and on the hoardings. Educational and training programmes, advertisements, safety and health propaganda, and much current didactic literature make use of pictorial material. Certain characteristic perceptual habits have become normal for Western culture, and for the groups professing it. Pictorial representation of a three-dimensional scene requires the observance and acceptance of certain artistic or graphic conventions. Pictorial depth perception depends upon response to these conventional cues in the two-dimensional representation. There are three such cues concerned with form only, viz., object size, object superimposition or overlap, perspective. In the visual world, of two objects of equal size, that object nearer the observer is larger. When one object overlaps another the superimposed object is nearer to the observer. Parallel lines tend to converge with distance from the observer. In the two-dimensional representation of the three-dimensional scene, foreground objects are depicted larger than background items. Superimposed objects are perceived as nearer. Pictorial structuring by perspective technique is accepted as a convention for depicting distance. The incidental evidence furnished on Pictorial T.A.T., by African samples indicates that these pictorial conventions are not accepted in such sub-cultural groups. The present investigation is limited to the study of the perception of three dimensions in pictorial material by sub-cultural groups in southern Africa.

## B. METHOD

### 1. *Test Material*

Test material was constructed to isolate the pictorial depth cues of object size, object superimposition, and perspective. Eleven outline drawings and one photograph were constructed. For experimental purposes pictorial space was given two positions, horizontal and vertical space.

Horizontal space is the perceptual scan from side to side of the picture. Vertical space is the scan from bottom to top of the picture. If an observer perceives a picture two-dimensionally the representation of objects adjacent to one another in horizontal pictorial space will be perceived as equivalent to their lying in the same plane in the visual world. Objects on the margins of the pictures will be perceived as distant from one another. Objects in the centre as near one another. This perceptual habit will persist regardless of depth cues of object size, superimposition or perspective. The experimental situation is simple to construct. Pictures 1-6 were designed to obtain

the responses of observers to depth cues of size, overlap and perspective in horizontal pictorial space. Each picture is similarly structured. The elephant is positioned centrally between a human figure and an antelope. In this

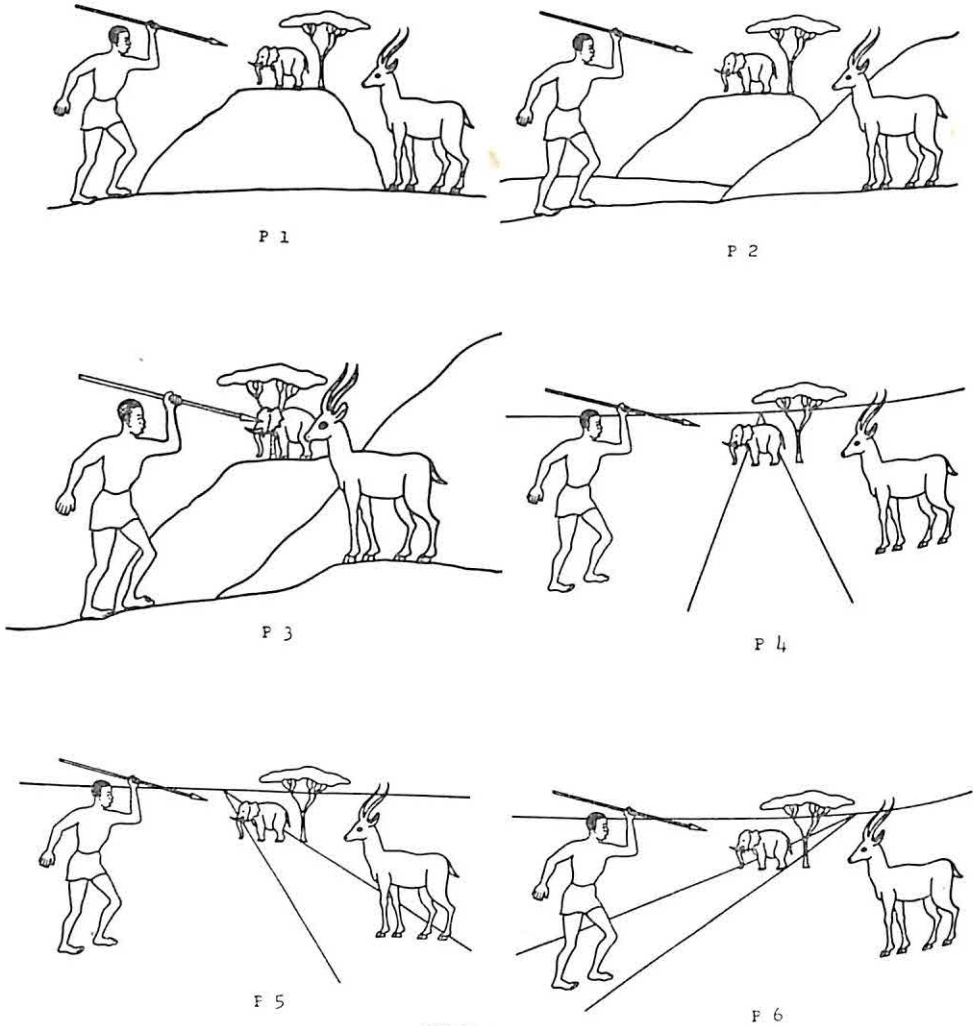
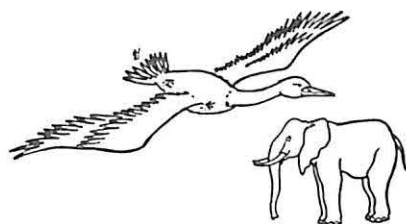


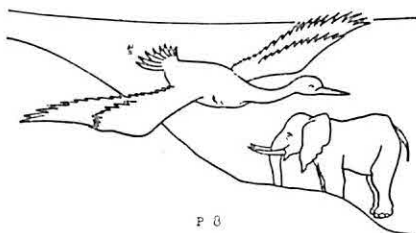
FIGURE 1  
HORIZONTAL PICTORIAL SPACE

"hunting scene," the elephant is depicted smaller than the antelope. This object size depth cue occurs in each of the six pictures. Pictures 2 and 3 carry the additional depth cue of overlapping. Pictures 4, 5, and 6 have perspective lines representing a road vanishing in a horizon. In all pictures the hunter's assegai is aligned on both elephant and antelope.

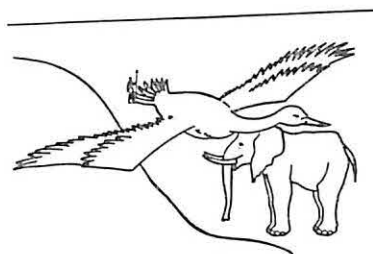
Vertical pictorial space is more difficult to construct experimentally. If three objects are placed one above the other in a picture, the order of proximity in the picture is the same as that in the visual world. Normally, in vertical pictorial space, the two-dimensional perceiver and the three-dimensional perceiver give the same correct response. Pictures 7-11 were



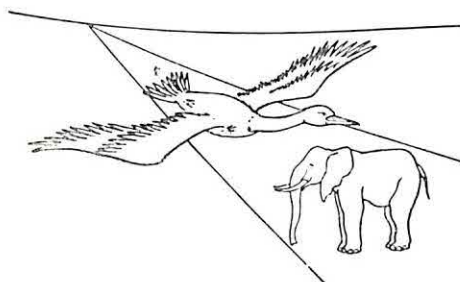
P 7



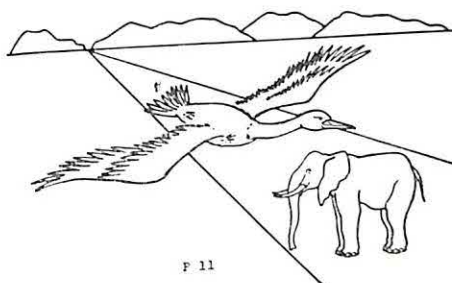
P 8



P 9



P 10



P 11

FIGURE 2  
VERTICAL PICTORIAL SPACE

designed to investigate the same depth cues in vertical space. A similar scene, the "flying bird scene," is portrayed on each picture. The bird is drawn larger than the elephant in all cases. In Picture 7, object size is the sole depth cue. In Picture 8 and 9, there is overlapping, and in Pictures 10 and 11, perspective is introduced.

Picture 12 was a photographic reproduction of the "hunting scene" in



horizontal pictorial space using modelled objects. Human figure, elephant, and antelope were modelled to scale and subsequently photographed to reproduce a scene similar to Picture 1.

The 12 pictures are shown in Figures 1, 2, and 3. Figure 1 contains the "hunting scenes" in horizontal space (Pictures 1-6). Figure 2 contains the "flying bird scenes" in vertical space (Pictures 7-11). Figure 3 contains the photograph of the "hunting scene" in horizontal space (Picture 12).

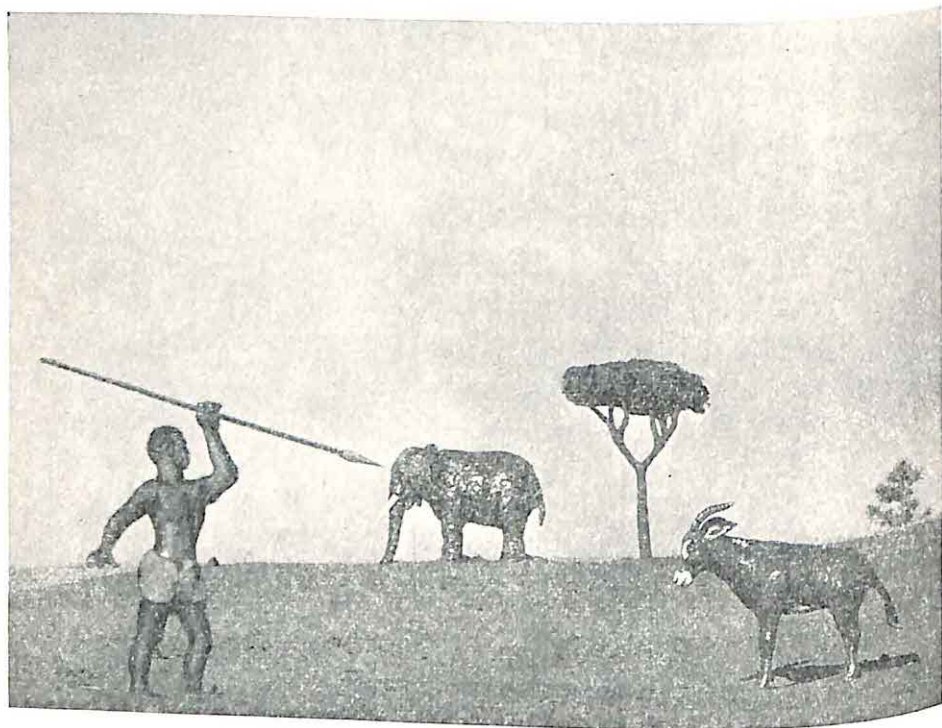


FIGURE 3  
PHOTOGRAPHIC REPRODUCTION, USING MODELLED OBJECTS

Dimensions of test Pictures 1-11 were 20 inches by 15 inches, and of Picture 12, 6 inches by 4 inches. For easy reference, Pictures 1-11 are classified by depth cues in Table 1.

## 2. *Testing Procedure*

Pictures were presented separately to individual candidates in the given order. Questioning was done orally in whatever tongue was mutually intelligible to both candidate and tester. Where this practice was not feasible (with illiterate samples from different territories in southern Africa), an

interpreter was used. Answers were recorded seriatim. Complete picture sets were not administered to the first four samples.

TABLE 1  
CLASSIFICATION OF TEST PICTURES BY DEPTH CUES (P.1-11)

Depth perception area	Depth cue	Test pictures
Horizontal pictorial space ("Hunting Scene")		P 1-6
	Size	P 1
	Superimposition	P 2-3
	Perspective	P 4-6
Vertical pictorial space ("Flying Bird Scene")		P 7-11
	Size	P 7
	Superimposition	P 8-9
	Perspective	P 10-11

Candidates were asked the following questions while viewing each picture:

1. Hunting Scene: (Pictures 1-6, 12)
  - a. What do you see?
  - b. What is the man doing?
  - c. Which is nearer the man, elephant or antelope?
2. Flying Bird Scene: (Pictures 7-11)
  - a. What do you see?
  - b. Which is nearer the man, elephant or bird?

In response to Question 1 in both scenes, candidates were required to identify each object in each picture, viz., man, assegai, elephant, tree, hill, antelope on Picture 1.

In the "hunting scene," if a candidate reported that the man was aiming or throwing the spear without specifying his quarry, an additional question was asked to clarify whether he was aiming at elephant or antelope. In the majority of cases, this additional question was unnecessary.

### 3. Scoring Method

For reasons to be discussed later, responses to Question 3 in the "hunting scene" and to Question 2 in the "flying bird scene" were taken as indicative of the type of dimensional pictorial perception possessed by a candidate. If candidates reported the antelope in the "hunting scene" to be nearer the man than the elephant, their responses were classified as three-dimensional (3D). If candidates reported the elephant in the "flying bird scene" to be nearer the man than the bird, their responses were classed as three-dimensional. Similarly, for Question 2 in the "hunting scene," if candidates reported the hunter to be aiming at the antelope, these responses were classified as three-

dimensional. All other responses in the scenes were characterised as two-dimensional (2D). For convenience 2D and 3D responses are listed in Table 2 for all pictures.

TABLE 2

	3D	2D
Hunting Scene (Pictures 1-6, 12)	Antelope	Elephant
Flying Bird Scene (Pictures 7-11)	Elephant	Bird

#### 4. Samples

The test was administered to 11 samples. Characteristics of these samples are given in Table 3. Samples fell into two main types, a non-school-attending group (Samples *a-e*) and a school-attending group (Samples *f-k*). The non-school-attending group contained no children and consisted of four black and one white sample. The school-going group consisted of children mainly except for one sample of adult teachers. Three of the samples in this group were black, and three white. All samples were tested in the Union of South Africa. Samples *a-d* contain candidates whose territorial origins cover the Union of South Africa, South West Africa, High Commission territories, Federation of Rhodesias and Nyasaland, East Africa, Mozambique, and Angola. Age and educational data are lacking for two cases in Sample *e*.

### C. RESULTS

Analysis of the data is directed towards the estimation of intersample differences in pictorial depth perception and towards the determination of the effect of quantifiable factors on such perception. There are four sections to this analysis; intersample differences in depth perception for outline drawings; intersample differences in depth perception for photographs; object identification as a factor in dimensional perception; intelligence and educational levels as factors affecting dimensional perception.

#### 1. *Intersample Difference in Depth Perception For Outline Drawings (Pictures 1-11)*

For each of the 11 samples the percentage number of candidates giving 3D responses (reporting antelope nearer man on Pictures 1-6, and elephant nearer man in Pictures 7-11) are listed in Table 4. 3D responses are fairly consistent per sample over the 11 pictures. To determine interpicture differences  $\chi^2$  tests (Cochran, 6) were done on each sample. Where percentages differ significantly (.01 level) within a sample, these are printed in italics.



TABLE 3  
CHARACTERISTICS OF SAMPLES

	n	Age				Education				Occupation				
		Under 14	14-20	21-40	Over 40	Illit- erate	Pri- mary	High- er	Grad- uate	Un- skilled	Skilled	Clerical	Profes- sional	Scholar
a. Mine labourers (Illiterate) (Black)	57	—	36	19	2	57	—	—	—	57	—	—	—	—
b. Mine labourers (Primary) (Black)	54	—	23	29	2	—	54	—	—	54	—	—	—	—
c. Mine clerks (High School) (Black)	48	—	3	34	11	—	—	48	—	—	—	48	—	—
d. Mine labourers (Illiterate) (Black)	45	—	12	29	4	45	—	—	—	45	—	—	—	—
e. White labourers	60	—	2	29	27	10	46	2	—	57	3	—	—	—
f. School children (Grades & Std. 1) (White)	42	42	—	—	—	—	42	—	—	—	—	—	—	42
g. School children (Grade 1—Std. 6) (White)	113	113	—	—	—	—	113	—	—	—	—	—	—	113
h. School children (Std. 6) (Black)	34	—	34	—	—	—	34	—	—	—	—	—	—	34
i. Teachers (Graduate) (Black)	25	—	—	22	3	—	—	—	25	—	—	—	25	—
j. School Children (Stds. 8 & 10) (Black)	52	—	47	5	—	—	—	52	—	—	—	—	—	52
k. School children (Stds. 5 & 6) (White)	32	32	—	—	—	—	32	—	—	—	—	—	—	32

TABLE 4  
PERCENTAGE CANDIDATES WITH 3D RESPONSES PER PICTURE

Samples	n	Horizontal space						Vertical space				
		Size P <sub>1</sub>	Super- imposi- tion P <sub>2</sub>	Super- imposi- tion P <sub>3</sub>	Perspec- tive P <sub>4</sub>	Perspec- tive P <sub>5</sub>	Perspec- tive P <sub>6</sub>	Size P <sub>7</sub>	Super- imposi- tion P <sub>8</sub>	Super- imposi- tion P <sub>9</sub>	Perspec- tive P <sub>10</sub>	Perspec- tive P <sub>11</sub>
<i>a</i>	57	0	0	—	0	0	0	—	—	—	—	—
<i>b</i>	54	0	0	—	2	0	2	—	—	—	—	—
<i>c</i>	48	23	40	—	31	17	20	—	—	—	—	—
<i>d</i>	45	—	—	2	—	—	—	2	4	4	2	2
<i>e</i>	60	13	20	23	8	15	13	13	11	16	10	13
<i>f</i>	42	26	31	69	29	33	26	24	45	52	24	29
<i>g</i>	113	47	57	93	57	63	51	50	65	71	42	39
<i>h</i>	34	50	68	76	53	50	65	62	53	68	56	39
<i>i</i>	25	56	76	80	60	68	60	52	56	52	48	52
<i>j</i>	52	69	69	94	62	73	63	79	73	85	73	62
<i>k</i>	32	75	88	100	81	97	78	78	75	91	62	60

With white school-going samples *f* and *g*, 3D responses increase for pictures with depth cues of overlapping lines and objects (Pictures 3, 8, 9). This finding holds also for the black high school sample in horizontal pictorial space only (Picture 3). White primary pupils (Samples *g* and *k*) perceive pictures with perspective cues in vertical space (Pictures 10, 11) as three-dimensional less frequently than those with other depth cues.

The white school-going samples are less consistent dimensional perceivers than the black samples. These samples are more influenced by the specific depth cues. Superimposition cues make 3D perception easier, and perspective makes it more difficult. This might be expected from the nature of these artistic conventions, since the representation of pictorial distance is more symbolic with perspective than with overlapping. The dimensional perception of the black school-going and remaining non-school-attending samples is more consistent, more generalised in the sense of being less responsive to particular depth cues.

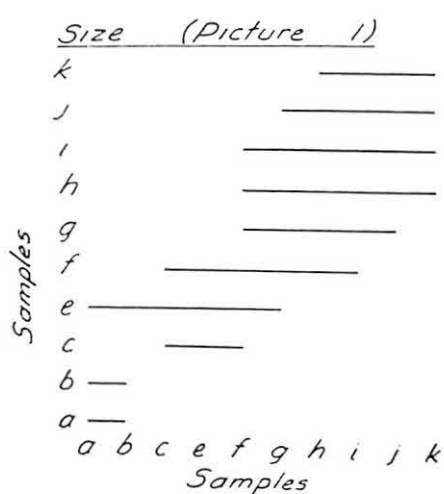
TABLE 5  
PERCENTAGE CANDIDATES WITH CONSISTENT 3D RESPONSES PER DEPTH CUE

Samples	n	Horizontal space			Vertical space		
		Size P <sub>1</sub>	Super- imposi- tion P <sub>2-3</sub>	Perspec- tive P <sub>4-6</sub>	Size P <sub>7</sub>	Super- imposi- tion P <sub>8-9</sub>	Perspec- tive P <sub>10-11</sub>
<i>a</i>	57	0	—	0	—	—	—
<i>b</i>	54	0	—	0	—	—	—
<i>c</i>	48	23	—	12	—	—	—
<i>d</i>	45	—	—	—	2	2	2
<i>e</i>	60	13	13	5	13	7	8
<i>f</i>	42	26	31	17	24	31	19
<i>g</i>	113	47	56	42	50	53	27
<i>h</i>	34	50	56	35	62	47	56
<i>i</i>	25	56	68	48	52	44	36
<i>j</i>	52	69	69	48	79	67	54
<i>k</i>	32	75	88	72	78	69	44

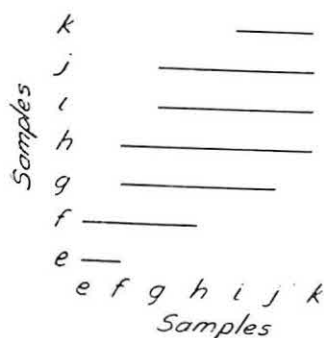
In Table 5, pictures have been grouped according to depth cues and dichotomised into horizontal and vertical pictorial space. For each sample, percentage numbers of candidates who consistently perceive the pictures three-dimensionally are listed. Thus in Sample *e* for horizontal space, 13 per cent perceive Picture 1 three-dimensionally. The same candidates perceive Pictures 2 and 3 (with superimposition cues) three-dimensionally. But only 5 per cent remain, who perceive Pictures 4, 5, 6 three-dimensionally. Entries listed under vertical space in the table are read in the same way.

Significant intersample differences were computed for each depth cue

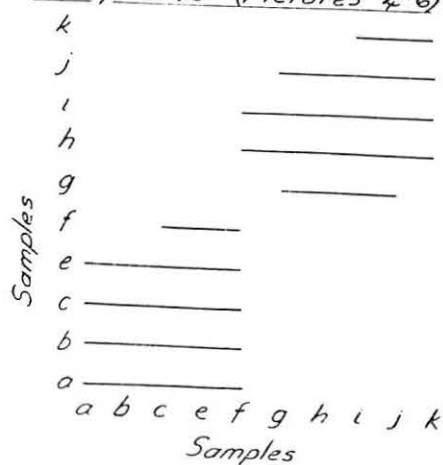




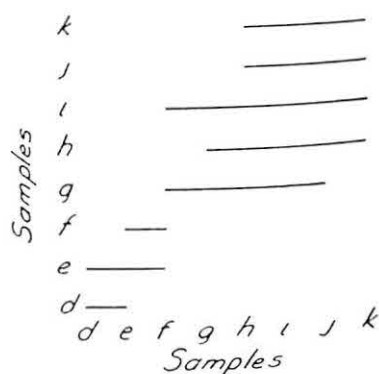
Superimposition (Pictures 2-3)



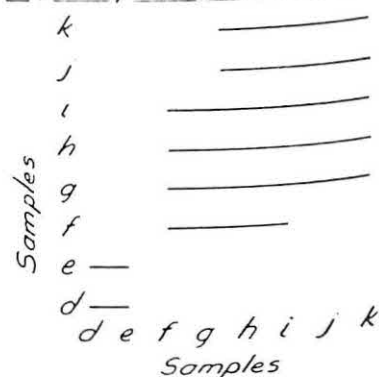
Perspective (Pictures 4-6)



Size (Picture 7)



Superimposition (Pictures 8-9)



Perspective (Pictures 10-11)

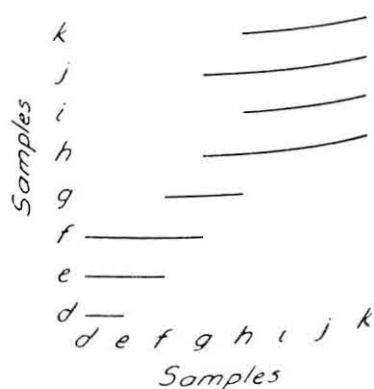


FIGURE 4  
SAMPLE CLUSTERING BY DEPTH CUE DERIVED FROM  $\chi^2$  TESTS

listed in Table 5.  $\chi^2$  tests with acceptance level .01 showed intersample differences which permitted the grouping of samples in terms of perceptual consistency. These results are given schematically in Figure 4. In the graph, each row refers to the sample indicated on the left. The sample in question differs significantly only from those samples which correspond to the columns through which no line has been drawn in that particular row. Thus in the graph of Picture 1, which deals with the cue of object size in horizontal pictorial space, opposite Sample *k* (side scale) a line is drawn in the row beginning from Sample *h* and running to Sample *k* (reading bottom scale). This means that Sample *k* does not differ from Samples *h*, *i*, *j*, but does differ significantly from Samples *a*, *b*, *c*, *e*, *f*, *g*. Similarly in the same graph, with Sample *c* (side scale reading) the line in the row starts from Sample *c* and runs to Sample *f* (bottom scale reading). This means that Sample *c* differs significantly from Samples *a*, *b*, *g*, *h*, *i*, *j*, *k*, but not from Samples *e* and *f*. If a similar procedure is followed in reading the other graphs concerned with the remaining depth cues, it will be seen that the samples form two main groupings common to all depth cues in respect of 3D perceptual consistency. For the sake of clarity these groupings have been tabulated in Table 6.

TABLE 6  
SAMPLE CLUSTERS PER DEPTH CUE

Horizontal space			Vertical space		
Depth cue	Samples		Depth cue	Samples	
Size	3D	<i>g-k</i>	Size	3D	<i>g-k</i>
	2D	<i>a-f</i>		2D	<i>d-f</i>
Super-imposition	3D	<i>f-k</i>	Super-imposition	3D	<i>f-k</i>
	2D	<i>e</i>		2D	<i>d-e</i>
Perspective	3D	<i>g-k</i>	Perspective	3D	<i>g-k</i>
	2D	<i>a-f</i>		2D	<i>d-f</i>

The two main sample groupings are Samples *a-e* and Samples *g-k*, with Sample *f* fluctuating between them. Samples *a-e*, the inferior 3D performers, represent the non-school-attending group and include illiterates and post school both black and white. Samples *g-k*, the superior 3D perceivers, contain the school-attending group, black and white. Sample *f* which falls with the inferior 3D performers for depth cues of size and perspective and with the superior 3D performers in pictures where overlapping of objects occurs, consists of white school children at the beginning of the primary school.

In addition to demonstrating the grouping of samples for 3D perceptual

consistency, Figure 4 illustrates a point which has already been made with respect to the data in Table 4, viz., superimposition depth cues lead most frequently to 3D perception.

Intersample differences in depth perception are such as lead to the grouping of samples into a non-school-attending group and a school-attending group containing in each case both black and white samples. The school-going group are superior 3D perceivers but their responses depend far more on the type of depth cue prescribed in the picture than do those of the non-school-attending group.

## 2. Intersample Differences in Depth Perception for Photographs

Percentage number giving 3D responses to Question 3 on Picture 12 (antelope nearer hunter) are listed for samples taking this test (Table 7).

TABLE 7  
PERCENTAGE CANDIDATES WITH 3D RESPONSES (P12)

Samples	n	Percentage
<i>d</i>	45	0
<i>f</i>	42	72
<i>g</i>	113	85
<i>h</i>	34	76
<i>i</i>	25	92
<i>j</i>	52	81
<i>k</i>	32	100

There are two distinct groups of samples confirmed by  $\chi^2$  tests (.01 level of significance). Illiterate mine workers do not see the photograph three-dimensionally. The remaining samples, where a high proportion of candidates perceive three-dimensionally, are all school-going samples, both black and white. There are minor differences within this second group. White school beginners (Sample *f*) and black pupils at the end of their primary course (Sample *h*) perceive the photograph three-dimensionally less frequently than do white pupils at the end of their primary course (Sample *k*). But the main intersample difference in depth perception in photographs lies between the illiterate black sample and the school-going group, both black and white.

## 3. Object Identification as a Factor in Dimensional Perception

Since pictorial depth perception depends upon the perception of the appropriate cues there must be a direct relationship between object identification and dimensional perception.



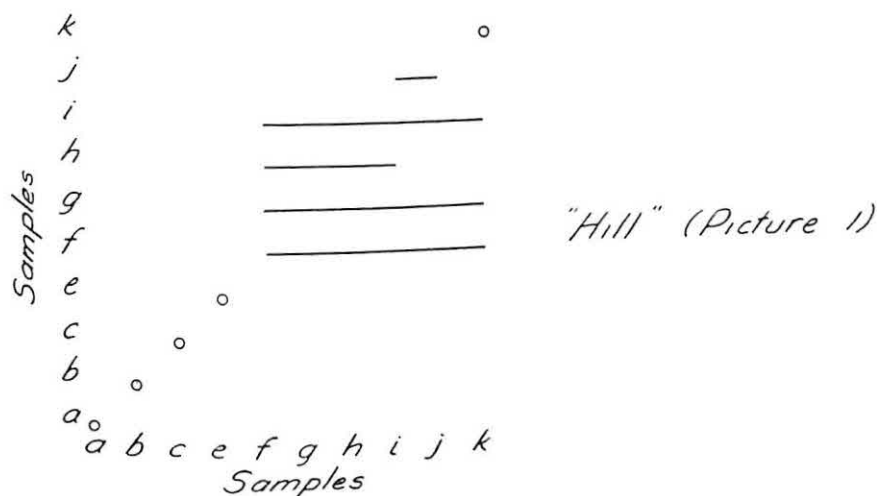
In all pictures, except Picture 3, the man, the animals, and the bird were correctly identified. In Picture 3, the depth cue of overlap was introduced and as can be seen from Figure 1, objects were superimposed over the central figure of the elephant in order to enhance the perception of depth. With the illiterate Sample *d*, this technique defeats its own object by complicating the representation of the elephant to such an extent as to render it unrecognisable to the candidates. Non-identification of the elephant by this sample for this picture (35 per cent) is much more frequent than by other samples ( $\chi^2$  test, .01 level). This findings does not apply to Picture 2 where overlap is also used. In this instance superimposition is restricted to contour lines, so that the animals and objects retain their definition.

Non-identification and mis-identification occur most frequently with items or lines associated with or representing depth cues. In Picture 1, the elephant is drawn standing on a "hill." Contour lines represent "mountains" in Pictures 2, 3, 8, 9. Central perspective lines vanishing in a horizon represent a "road" in pictures 4, 5, 6, 10, 11. Table 8 gives the percentage numbers of candidates per sample who failed to identify (NON) or identified incorrectly (MIS) the "hill" in Picture 1, the "mountains" in Picture 2 and the "road" in Picture 4. It is clear that there are wide inter-sample differences.  $\chi^2$  tests (.01 level of significance) computed between samples on the total number of incorrect identifications (MIS + NON) showed that there were two main groupings of samples. This finding is illustrated in Figure 5, which is read in the same manner as Figure 4. For identification of "hill" in Picture 1, Samples *a, b, c, e* differ significantly from one another, and are inferior identifiers to the sample grouping *f-k*. The dichotomy on the three pictures is Samples *a-e* (non-school group) and Samples *g-k* (school-going group) with white school beginners (Sample *f*) fluctuating between these main groupings. These findings, demarcating the samples in terms of object identification, resemble those obtained for dimensional consistency (Figure 4.).

#### 4. *Intelligence and Educational Levels as Factors Affecting Dimensional Perception*

The influence of these two factors was tested in Sample *g* (white primary pupils) for horizontal pictorial space only. Candidates ranged from Standards 1-6 in a white primary school and numbered 124. This sample contained the same candidates as Sample *g* plus additional pupils who were tested on Pictures 1-6 only. Educational level was divided into five class intervals, Standards 5 and 6 being combined to increase number







of candidates in the cell. Intelligence was estimated by the New South African Group Test. Intelligence level was distributed in six class intervals of 10 IQ points each, ranging from 80-149.

A two-way variance analysis (Kendall, 10) gave the findings in Table 9, which demonstrates both factors to be significant at .01 level. There is

TABLE 9  
TWO-WAY VARIANCE ANALYSIS ON INTELLIGENCE AND EDUCATION

	1	2	F	p
IQ	5	98	4.512	.01
Standard	4	98	9.778	.01
Interaction	17	98	1.218	.01

no interaction between the factors. There is therefore a direct relationship between pictorial depth perception and both factors, school standard, and intelligence level as measured by IQ test. Examination of individual scores shows further that high intelligence level may be associated with 3D perception independently of educational level. The corollary does not hold. Advancement through the primary school tends to have a levelling effect and to promote 3D pictorial perception regardless of intelligence level. This finding is corroborated by data in Table 4, where it is shown that all candidates in Sample *k*, upper primary white sample, saw Picture 3 three-dimensionally and only one of them saw Picture 5 two-dimensionally.

Samples *a*, *b*, *d* were tested on a test battery designed for the occupational classification of African industrial workers (Biesheuvel, 3). The four tests are all of a performance type, and the test which is most occupationally predictive is a modified cube construction test. The battery is regarded as measuring level of effective capacity or the capacity to grasp the essentials of a task and to profit by experience. Candidates are ranked by the battery on a 12 point scale (dudec) validated on industrial samples. Figure 6 shows distribution of candidates for the two illiterate samples combined (*a*, *d*) and for the mine labouring Sample *b* (primary school level). They are distributed along the dudec scale where Dudec 1 represents a very superior performance and Dudec 12 a very inferior one. Reference to Table 5 will show that regardless of this performance distribution, no candidates in Samples *a* and *b* and only 2 per cent in Sample *d* see the outline drawings three-dimensionally. No candidates in Sample *d* perceive the photograph three-dimensionally. It follows from these findings that with these samples educational level in the primary school and performance as measured by

the occupational classification battery are not factors which affect 3D pictorial perception.

#### D. DISCUSSION

White and black school-going samples perceive depth more frequently in pictorial material than do illiterate black samples, and samples, both black and white, which have terminated their school course and live in

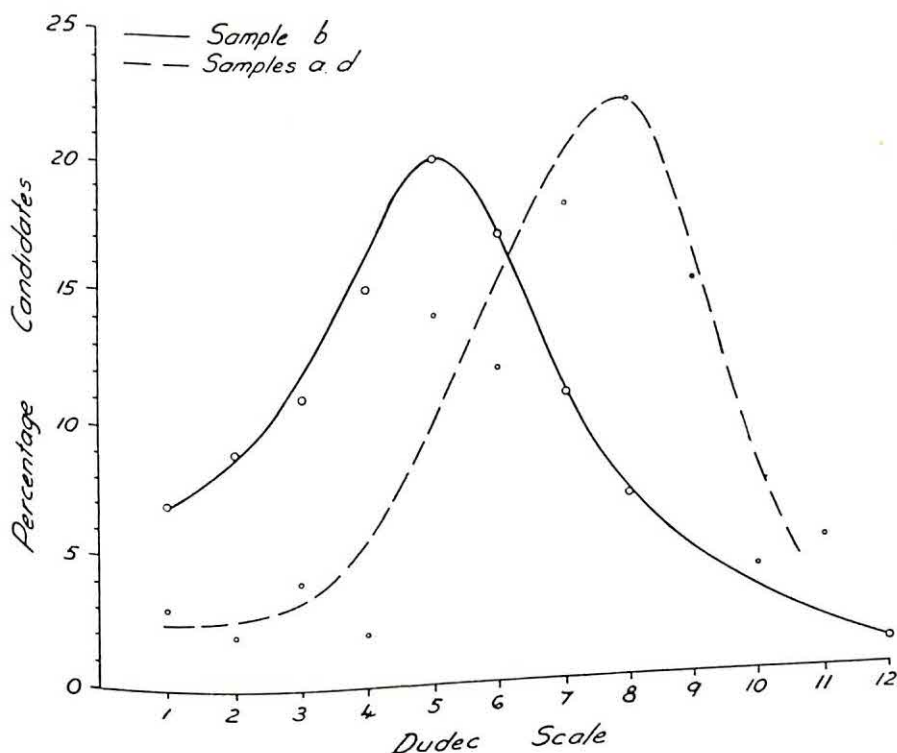


FIGURE 6  
DISTRIBUTION OF CANDIDATES ON DUDEC SCALE

isolation from the dominant cultural norm. As expected there is a direct relationship between incorrect identification of items, in the drawings and two-dimensional perception, but correct identification does not predicate three-dimensional perception. Outline drawings making use of perspective depth cues are less frequently seen three-dimensionally than those using overlap or size depth cues. This finding holds particularly in the case of white primary school pupils. School-going samples perceive three-dimensions in a photograph more readily than in an outline drawing, but this finding

does not apply to illiterate samples. Intersample differences are less pronounced with photographic material than with outline drawings. Intelligence and educational level are factors which independently influence dimensional pictorial perception, but they appear to do so only with white school-going samples.

There are three hypotheses which can be set up on these results: (a) that the results are artifacts of the test, (b) that the results are culturally determined, (c) that the results are genetically determined.

### 1. *Test Artifacts in Dimensional Pictorial Perception*

This hypothesis has two aspects to it: (a) How far has the perceptual structure of the test influenced results? (b) How far has the semantic structure of the test influenced results?

Outline drawings were used to provide the simplest and least graphically contaminated medium for the representation of the appropriate depth cues in a standard scene. Such drawings have representational drawbacks. Perspective cues in particular tend to become symbolic and unrealistic, and the high proportion of incorrect identifications, particularly in the illiterate samples, lends support to this view. But comparison of Tables 4 and 8 for Picture 1 in all samples will show that depth perception is not dependent upon correct identification of the items. For example, in the first sample, 42 per cent identify the hill correctly in Picture 1 and 5 per cent identify the road, but 0 per cent perceive the pictorial material three-dimensionally. Further, responses to the photographic reproduction (Picture 12) of the same pictorial scene modelled show that with that form of two-dimensional representation, which is least symbolic and most realistic of three-dimensions, the illiterate sample continues to perceive two-dimensionally. Work by Smith *et al.* (15) on perceived distance as a function of the method of representing perspective showed that judgments of distances in drawings do not vary with the amount of detail included. They also concluded that the perception of depth did not differ in perspective line drawings and in photographs. These findings corroborate the evidence in the present study and on these grounds the hypothesis that test results are an artifact of the perceptual structure of the test can be rejected.

To candidates skilled in handling the relational aspects of pictorial space, the relative proximity of the elephant to the human in both the "hunting scene" and the "flying bird scene" is understood as existing in projective space, and not in topological space, as defined by Piaget (14). For other candidates pictorial proximity is topological and objects which are adjacent



to one another in the picture are perceived as being next to each other in pictorial space. Hence a semantic problem arises. What do candidates understand the tester to mean when he asks the question—Which is nearer the man, elephant or antelope? Does the tester expect a topological or a projective response? There is evidence to show that 2D responses are not semantically dependent on the wording of the question. With all samples except high school pupils (black) and graduate teachers (black) responses, whether 3D or 2D, were immediate. With the two samples specified hesitation in responding was noticeable and was particularly pronounced with the graduate teachers, some of whom took as long as one hour per picture to respond. Part of this hesitation may be due to occupational cautiousness or insecurity, but part of it was exposed by introspection as a problem in perceptual organisation. Candidates asked the tester for information on the mode of perception because there were to them two possibilities, viz., 2D or 3D, and they appealed for guidance in their perceptual choice. Their pictorial space could be either topological or projective, which means that to them "nearness" was semantically unstable in the questionnaire. For the less highly educated and illiterate samples which perceived the pictures two-dimensionally in a majority of cases, there is additional evidence. Following their identification of objects in the pictures candidates were asked what the hunter was aiming at in the "hunting scene," prior to being questioned on relative proximity of animals to hunter. Candidates in all samples, choosing the elephant as the hunter's quarry, were those who perceived the elephant as nearer the hunter than the antelope. This means that the whole manifest content of the picture tended to be perceived two-dimensionally, and appropriately interpreted. The occurrence of this phenomenon is considered to be a function of perceptual organisation and not merely a semantic evaluation. The hypothesis postulating the influence of the semantic structure of the test on candidates' responses is rejected.

## 2. *Cultural Factors in Dimensional Pictorial Perception*

There are two levels of cultural factors to be considered viz., (a) formal education, (b) informal training.

Evidence from Tables 4 and 9 shows that with white primary groups (Samples *f*, *g*, *k*) 3D perception is associated with educational level. The higher the educational standard, the more frequent is the occurrence of 3D pictorial perception.

This finding does not apply to black samples, otherwise markedly superior performances would be expected from black high school pupils (Sample *j*) and graduate teachers (Sample *i*) cf. Table 4. Candidates in Sample *b*

(mine labourers) possess a primary school level of education, but their pictorial perception is entirely two-dimensional and does not differ from that of the illiterate mine workers (Table 5). In addition the 3D perception of the white labourers (Sample *e*), the majority of whom have had primary schooling, is markedly inferior to that of the white school beginners (Sample *f*).

Training in pictorial perception is not included in the formal school curriculum. It is gradually acquired by white children between the ages of 6 and 12 years (Samples *f*, *j*, *k*). During that period, there is an informal process of almost continuous exposure to pictorial material in the school and in the home, so that by the age of 12 years, most white children have learned to perceive pictures three-dimensionally.

But pictorial depth perception is not learned by the white labourers in Sample *e*, although they attended school. Mundy-Castle and Nelson (12) have described this sub-culture elsewhere. It is an isolated group living under conditions of sheltered employment, closely intermarried, and centripetal. Families are large, and homes are poorly supplied with pictures, books, magazines, and newspapers. Consequently school-going children are not exposed in the home to the informal training necessary for the three-dimensional perception of pictorial material. School is equally isolated, and, as an agency by which the outside world may attempt to invade the community, is resisted by the elders of the group. There is little opportunity for scholars, unstimulated perceptually in the home, to acquire new depth perceptual organisation with respect to pictures.

The black samples are also isolated. This is particularly true of Samples *a-d*, which are migratory and rurally orientated. The black urban samples (*h*, *i*, *j*) are ethnocentrically isolated. They have been urbanised for one generation only. Homes, even of graduates, are poorly furnished with pictures and illustrated reading matter. The women-folk seldom read and then mainly literature in the vernacular. Most books owned by the men are of the nature of text-books. Daily and monthly magazines are taken, but most of these are sparsely illustrated with photographs. During the early years, however, when the white child is obtaining his informal training in pictorial material, the black child, even in an urban home, suffers from lack of exposure to pictures. He may acquire the skill at a later stage, but there is little opportunity for stimulation, particularly where formal schooling is presided over by teachers, many of whom perceive pictorial material two-dimensionally. Hence it does occur that a black graduate of London University perceives a picture flat. It also happens that a black teacher sees a picture flat, and his pupil perceives it three-dimensionally.



Such results are not unexpected. African art is essentially volumetric. Where it is pictorial as in wall decorations or body tattooing, it is either diagrammatic or two-dimensional naturalistic. Haselberger (8) reports on a long continuous history of two-dimensional mural art in Africa. Jeffreys (9) describes tattooing in Nigeria as the African counterpart to abstract pictorial art in Europe and America. Such evidence emphasises that the critical feature for pictorial depth perception appears to be adequate exposure to the appropriate experience. Exposure occurs during formal schooling and in informal training, but in both cases instruction in the specific experience is not systematic. Formal schooling does not appear to provide sufficient exposure to the experience during the formative period for perceptual organisation. Sub-cultures which are isolated or are restricted in the first urban generation to formal schooling are less successful in pictorial depth perception, and this success if it occurs, occurs later, educationally speaking. The apparent inconsistency of data can be resolved.

Data from the illiterate black samples (Samples *a*, *d*) and the black mine labourers with primary schooling (Sample *b*) are not consistent with this hypothesis. Figure 6 shows a distribution of performance for these samples in terms of a test battery which estimates general adaptability through performance tests. Occurrence of 3D perception in these samples is nil or negligible, even with photographic representation. The hypothesis concerning the intelligence determinant needs modification. It can be accepted with white samples but not with black. In sub-cultures which are isolated and minimally exposed to the specific experience of pictorial depth perception, intelligence level does not act as a determinant. In sub-cultures which are isolated, minimally exposed to the specific experience and inferior in general mental endowment, intelligence level is associated with 2D perception. In sub-cultures, which are acculturated to the norm, maximally exposed to the specific experience and with a normal range of intelligence, intelligence level is a factor affecting 3D perception, but its influence is restricted to the lower standards in the primary school.

It has been shown that pictorial depth perception is learned, but that the process can be retarded or prevented by cultural environment and intellectual endowment. Thouless (16), experimenting on Indian and British students, came to the conclusion that there was a racial difference in perception. He conducted a series of experiments to show that absence of perspective and of shadows in oriental pictorial art was determined by a real racial difference in perception and not by artistic convention or symbolism in graphic representation. He made the claim that the Indian students showed a significantly greater tendency towards object constancy or towards phenomenal



regression to the real object than did a group of British students. It is not clear how Thouless would apportion cultural and genetic determinants to this perceptual difference. But it may well be that both factors are operative in this instance. Such a hypothesis can be set up for sub-cultural samples in Africa. For many generations African tribes lived in physical and cultural isolation from one another and from the rest of the world. One characteristic of their culture is intricate auditory perception represented in tonal languages, and complicated musical patterns (Biesheuvel, 4). Educational level is a factor affecting pictorial depth perception, but it operates in this manner within a set of cultural conditions specific to the group. Where these conditions are not fulfilled the effect of the factor is nullified or modified.

### 3. *Genetic Factors in Dimensional Pictorial Perception*

Discussion on the cultural findings leads to the partial acceptance of the cultural hypothesis. It remains to consider the influence of genetic determinants. It is generally accepted that intelligence test score is a composite index of performance which includes both environmental and genetic factors. It is not strictly correct therefore to regard intelligence test score as a direct reflection of genetic composition. But within groups which are homogeneous and subjected to the same environmental stimuli, it is legitimate to treat individual differences as reflecting genetic disposition. With this proviso, intelligence test score is discussed here under the heading of genetic determinants and the argument refers throughout to individual differences in homogeneous sub-cultural groups.

Table 9 shows that, independent of educational level, intelligence is a factor which affects three-dimensional perception of pictorial material. This finding is obtained on white primary school pupils. Corroborative evidence is available in the white labouring group (Sample *e*) where 3D performance is markedly inferior to that of the primary white children (Sample *g*). Mean IQ (South African modification of Wechsler Bellevue Test) for this group is  $74.8 \pm 15.2$ . Mean IQ of white primary children is  $104.7 \pm 7.9$ . By Standards 5 and 6, most of the white pupils have acquired pictorial depth perception (Tables 4, 5, 7). But the distribution of IQ's in these standards is not significantly higher than that in any of the lower school standards. There appears to be an educational threshold below which a white child with superior intelligence can perceive depth in pictures. As the educational level rises, the intelligence threshold becomes less critical. But there appears also to be an intelligence threshold below which a white adult does not perceive three-dimensionally regardless of his educational level. It may

well be that the physical environment promoted auditory perceptual development at the expense of visual perception. In the bush and the forest the ear was a better predictor of danger than the eye, and so by a process of natural selection auditory perceptual organisation became more characteristic of their culture than visual perceptual development. One aspect of such cultural qualitative differences might lie at a superficial level of perceptual organisation, viz., depth perception of pictorial material. There is nothing in the findings to disprove the hypothesis. The white labourer results can be explained sufficiently on the basis of isolation plus low intellectual level. The findings on the black samples are more difficult to understand adequately on cultural differences alone. The process of pictorial depth perception is not beyond the capacity of the black man, but it is a skill in which he has a good deal of leeway to make up. Both cultural and genetic factors play their role in the process, but the elucidation of their relative contributions is beyond the scope of this paper.

#### E. IMPLICATIONS OF THE FINDINGS

The findings have a bearing on pictorial material, wherever used didactically. No hard and fast rule can be promulgated beyond that of being aware of sub-cultural differences in pictorial depth perception, of checking to determine the dimensional characteristic, and of training in three-dimensional perception where necessary. With illiterate and isolated sub-cultures in Africa, it would be fairly safe to conclude at present that 2D perception was characteristic. Educated African groups would require more detailed sampling. These general rules have equal force in the field of pictorial advertisement, safety and health propaganda, and in the illustrated press, whether political, religious, or academic. It is pointless to use the conventions of object size, superimposition, and perspective, and to structure manifest content on these cues, if the sub-culture to be exposed to them perceives pictorial material two-dimensionally.

#### F. SUMMARY

Pictures constructed to provide self-evident responses of 2D or 3D perception on the depth cues of object size, superimposition and perspective were given to 11 samples, six of them school-going (3 white, 3 black) and five of them non-school-going (1 white, 4 black). School-going samples saw predominantly three-dimensionally, the others almost entirely two-dimensionally both in outline drawings and on a photograph. The hypothesis that their dimensional perception was an artifact of test construction was rejected. Formal schooling and informal training combined to supply an exposure



threshold necessary for the development of the process. Cultural isolation was effective in preventing or retarding the process, even in candidates possessing formal education of an advanced level. An intelligence threshold existed also for the process, but its development with candidates of average or higher intellectual endowment depended upon exposure to the specific experience and probably upon cultural characteristics which in Africa might have genetic perceptual determinants. The implications of the findings on advertisement and propaganda and on all didactic pictorial material were discussed.

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## THE HUMAN FIGURE DRAWINGS OF BEDOUINS\*

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### A. INTRODUCTION

Recent interest in human figure drawings, stimulated largely by Karen Machover (7), has been concerned primarily with individual differences in drawings in relation to personality. Often great significance is attached to peculiarities in the content and the formal characteristics of the figures drawn by the subject. In general, there is little conclusive evidence to support such interpretations (9).

Because of the preoccupation with the individual, little attention has been given in recent years to the large differences which exists between the human figure drawings which are produced by different cultural groups. It is our feeling that an examination of cultural influences upon drawings will show that interpretations of drawings in other cultures in terms of personality must be made with great caution.

In previous studies (2, 3), it has been shown that the location of drawings on the page, an aspect of drawings which has been given personality interpretations, is affected by calligraphic traditions with regard to the area of the page on which different linguistic groups begin to write. It seems likely that other cultural influences upon drawings will be found.

The present paper extends the study of cultural influences by examining the human figure drawings of illiterate Bedouins living in the Syrian desert. Their drawings are of particular interest because they have had minimal exposure to Western art, photography, cartoons, illustrations, etc. Furthermore, they have no native traditional forms of representational art, and only a meager amount of non-representational art. As one might expect, in drawing a man, a task which most of our subjects had never attempted previous to this study, they produce very primitive results. One would expect,

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too, that in order to produce human figure drawings at all they would find it necessary to make use of their traditional art forms. Both of these expectations appear to be supported by the results to be presented.

### B. BEDOUIN EXPERIENCE WITH ART FORMS

The more isolated Bedouin of today, who follows a nomadic pattern dependent upon the pasturing of sheep and other animals, leads a life which has changed but little within the past four thousand years. His needs are supplied primarily by the flesh, milk, wool, and hides of his domestic animals, which he uses directly or exchanges for other goods. In his semi-desert environment, he must move almost continually in search of pasture and water. Because of his mobility, his material possessions must be portable and few—a tent, clothing, and a few utensils. His nomadic life prevents him from attending schools, and hence results in illiteracy. His illiteracy cuts him off from newspapers, magazines, and books which are among the chief carriers of Western art. As a consequence, the Bedouin has minimal exposure to photographs, prints, illustrations, etc.

In addition to his physical isolation from Western art, he also has inherited a Moslem tradition which for many centuries forbade the production or procurement of representational art. It particularly rejected representations of human beings or of animals because such figures were equated with the idols of infidels. While this attitude has largely disappeared in modern Islamic cities, it persists in the more backward areas. Even where the traditional disapproval of representational art has disappeared, it has left in its wake a very impoverished artistic inheritance.

While the Bedouin's experience with representations of the human figure is slight, he is familiar with two-dimensional views of the human being. Distant silhouettes he, of course, sees. He also sees himself and others in shadows. The desert shadows are particularly distinct, approximating in their effect silhouette art. In addition it should be noted that the environment of the Bedouin provides sand, soil, and rocks on which figures can be made by sticks and stones. However, direct evidence concerning the use which the Bedouin children and adults make of these materials is lacking.

Nor are Bedouins completely removed from contact with Western art. Members of the nomadic tribes, particularly the men, make occasional visits to towns for trading purposes. As a result, packages and canned goods bearing pictures sometimes are found in Bedouin tents. In addition, some middle-eastern currency bears images of historical and modern persons, and Bedouins are familiar with coins and bills.



But while the nomadic Bedouin has *some* contact with pictorial art, his exposure to it is only a very small fraction of the exposure of the typical member of a Western nation. We have emphasized that the Bedouin's experience with art is not nil, because if it were nil he might not be able to produce even the poor human figure drawings which will later be described.

The Bedouin is most familiar with certain kinds of decorative, non-representational art. Every Bedouin sees tattoo patterns on the faces and hands of his fellow Arabs. He also sees henna patterns on the skin, jewelry such as rings, bracelets, beads, and necklaces, striped materials used for tent curtains, decorated saddles, copper coffee pots, copper trays, and decorated guns and knives.

The decorations just referred to share several common characteristics. In the first place, most of them are small. The tattoo patterns on the face and hands and henna patterns which are applied to the palmar surfaces of fingers and hands, because of their location, are necessarily small. The largest scarcely exceed three inches.

Tent curtains, used to partition the tent, usually consist of materials bearing longitudinal stripes. Some stripes bear woven decorative patterns. The patterns consist mostly of diamonds and triangles, partially or wholly filled in by solid color, or by dots or lines. Dickson (4 p. 72) illustrates some of these, giving measurements. The maximum width of the figures, which are placed on large curtains, is 3-4 inches.

Decorations applied to saddles, copper utensils, knives, and guns consist of small figures, or replicated small figures. The units of decoration, even those appearing on a large copper tray, are quite small. Since the decorative patterns are minute, they occupy only a part of the area in which they are placed. In other words, Bedouin surfaces, even those which are decorated, have large blank areas.

The decorative patterns used by Bedouins consist primarily of simple geometric figures, most commonly dots, circles, lines, and rectangles. These are used in tattoo patterns on the face and hands. Circles or discs are also used in decorating pieces of brass and silver, and circular semi-precious stones and are used as jewelry and to decorate the hilts of daggers.

When a geometric figure is placed on the skin or on other surfaces, the enclosed area is usually shaded or colored. We have previously referred to figures hennaed in solid color on the hands. In addition, the nails of the hands and toes are sometimes hennaed. In tattooing, uniformly colored dots, discs, rectangles, and triangles are often produced. Camel frames, used for litters or for carrying loads, are often decorated by broad colored bands



and by holes through which colored surfaces are seen (see Dickson, 4, illustrations following p. 656).

In summary, the decorative art of the Bedouins consists largely of solid patterns placed in unfilled areas. There is no proliferation of details. The patterns are small and made up largely of simple geometric forms.

### C. SUBJECTS AND PROCEDURE

Draw-a-man tests were obtained from three groups of Bedouins living in the Syrian desert. At the time of the testing they were located about 50 miles east of the town of Hama. The drawings were obtained by a research assistant, Mr. Khayrallah Assar, a resident of Hama, and a graduate student at the American University of Beirut. Mr. Assar was known to many of the men in the groups tested because they had pastured sheep on a share basis for Mr. Assar's father.

After locating a tribal group of men by driving over untracked desert areas, Mr. Assar explained to them that as part of his work as a university student he was studying the drawings of many groups of people. He asked each of them to draw a picture of a man. No compensation was promised or given. Many Bedouins found it amusing that they, who knew nothing about how to make pictures, should be asked to draw, but the majority complied with Mr. Assar's request. Drawings were obtained from as many men and boys as could be induced to cooperate in each of three tribal groups. It was not deemed advisable to ask that drawings be made by the women and girls. The total number of drawings obtained was 100. Of the males who participated, 28 were aged 6 - 8 years, 23 were aged 9 - 11 years and 49 were between 12 and 50 years.

The usual Goodenough instructions were used (6). A sheet of paper was placed on the experimenter's brief case which rested on the ground or on the seat or hood of his automobile. Many subjects protested that they had never drawn before, but they were urged nevertheless to try. Many did not know how to use a pencil and held it in unusual ways.

Under the circumstances it was impossible to keep others from watching the progress of a subject. The drawings of some subjects may have influenced the drawings of others, but it is certain that there was no communication of drawing content between the three tribes.

An attempt was made to ascertain the age of each subject, but the data on ages should be considered to be only approximate, since birth registration and calendars are unknown. However, since attention will be directed chiefly to the drawings made by the subjects over 10 years of age, and since age

appears to have little influence upon drawings beyond age 10, some inaccuracy in determining ages is not a serious consideration.

#### D. RESULTS

In describing Bedouin drawings, it is necessary first to consider the general level of drawing performance. The best measure of the level of complexity of human figure drawings seems to be the scale worked out by Goodenough. Each drawing was therefore given a mental age and IQ score, following Goodenough's procedures. It should be clear, however, that these values are not presented as measures of ability. Previous studies have shown that differences between groups in respect to Goodenough scores are due primarily to culture rather than to "native ability." Such scores, do, however, provide an objective measure of the relative richness of detail or completeness in different sets of drawings.

Scored according to Goodenough's procedures, the mean IQ of the 6-7-8-year-old Bedouins is 53. For the 9-10-11-year-olds it is 52. For the drawings made by subjects between 12 and 50 years of age, the mean mental age is 5.5 years. Analysis of the scores within this group shows no significant changes between ages 12 and 50. The mean IQ of those above 11 years of age, using a basal age of 10 years, is of course, 55, which is almost identical with the means obtained from the younger subjects.

The highest mental age earned, nine years, was received by a 13-year-old. No Bedouin scored a higher IQ than the 90 received by this boy. The very low level of performance exhibited by the Bedouins must be kept in mind in considering the content and formal qualities of their productions.

In describing the content and formal characteristics of the Bedouin drawings, it is desirable to contrast these drawings with those of some other known group. We have chosen American children as the comparison group. Goodenough (6) provides considerable data concerning the frequency of each of her scoring items among her standardization subjects. These data, however, were collected many years ago and refer only to aspects of drawing which are included in her scoring plan.

To supplement the comparison data provided by Goodenough, we have chosen from our files drawings by 100 American children whose Goodenough MA scores are between 5.0 and 5.9 years with an average MA of 5.5 years. Drawings meeting this criterion were selected at random from drawings obtained from children in New York City, a small town in Maryland, and a small town in Kansas.

In comparing American and Bedouin drawings we shall use the drawings of Bedouins between ages 12 and 50. Since there were only 49 such drawings, we added the drawing of an 11-year-old boy to this group in order to eliminate decimals from our statistics. In the main, therefore, we shall compare 100 American drawings which have an average MA of 5.5 years with 50 Bedouin drawings having the same mean Goodenough MA. The two groups are not perfectly matched, since the scores of the Bedouin group are not limited to the MA range 5.0-5.99. To have limited the Bedouin drawings to this range would have greatly reduced the sample. However, the differences between the groups to which we wish to call attention are so great that they can scarcely result from this factor.

Figure 1 reproduces several distinctive Bedouin drawings in actual size. These drawings were made by subjects aged 12 to 50 years. Attention is directed to the small size of the Bedouin drawings. The drawings average approximately two inches. Our sample of American drawings average approximately six inches. The overlapping between the groups is slight. Only 12 American drawings are as small as two inches. Only two Bedouin drawings are as large as six inches.

The difference between the groups in height is not due to differences in age. The drawings of the Bedouin subjects under age 12 also averaged two inches. The average height of the drawings of older American subjects in our files is six inches.

Table 1 presents several comparisons between Goodenough's five-year-old

TABLE 1  
FREQUENCY OF CONTENT IN VARIOUS GROUPS

	Goodenough 5-yr.-olds	Dennis 5-6 MA's	Bedouins Ages 12-50
Head present	99%		
Eyes present	93	100%	92%
Mouth present	80	95	56
Nose present	78	87	32
Some features present	*	77	32
Faces shaded	*	99	62
Arms present	64	3	34
Fingers present	49	70	90
Arms in outline	*	37	60
Trunk present	74	40	16
Trunk angular	*	67	88
Trunk rounded	*	34	64
Trunk shaded	*	32	22
Clothing present	35	15	48
Legs present	96	36	2
		99	98

\* No data supplied by Goodenough.



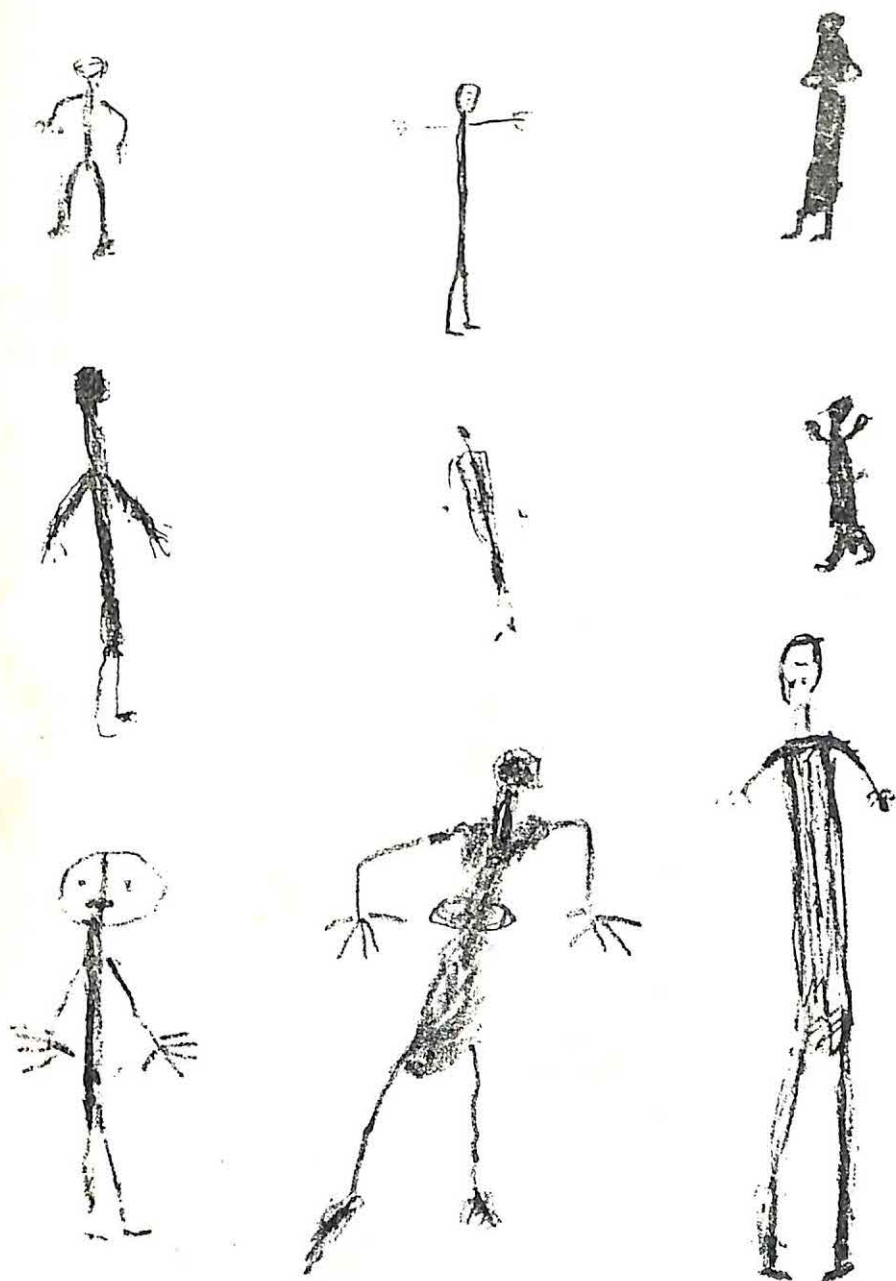


FIGURE 1  
HUMAN FIGURE DRAWINGS OF BEDOUINS

subjects, the older Bedouins, and our American subjects with MA's of five-to-six years. It will be seen that the eyes, nose, and mouth are much more frequently present in the American drawings than in the Bedouin drawings. Indeed, in 38 per cent of the Bedouin drawings no facial features are present whereas this is true of only one per cent of the American comparison drawings, a very striking difference. This means, naturally, that more than one-third of the Bedouin drawings may be described as having heads without faces. This is not due to the difference in orientation of the drawings. There is nothing about the Bedouin drawings to suggest that the person drawn is facing away from the observer. He is oriented toward the viewer but features are absent.

The absence of facial detail in many Bedouin drawings is associated with two factors. Most of the featureless drawings have the face shaded or darkened by pencil, making the representation of facial detail very difficult. The faces not so darkened were frequently so small as to almost obviate the presence of detail.

Since our American group and the Bedouin group were matched in regard to the total number of Goodenough scoring points, it is of course a mathematical necessity that a deficit of facial scoring points on the part of the Bedouins be accompanied by a corresponding excess of other scoring points. Table 1 shows that the under-emphasis upon facial details on the part of the Bedouins is accompanied by relatively greater emphasis upon hands, arms, and legs.

A difference between the two groups also exists with regard to the manner in which the arms are represented. When the arms are represented by American children, they are frequently drawn in outline. The Bedouin drawings employ a different technique. Outlines are seldom used. Instead the arm is drawn by making a single line, or by passing the pencil back and forth several times over approximately the same path, producing a broad heavy line.

The trunk is present with about the same frequency in both groups; however, the trunks drawn by the Bedouins are predominantly rectangular, whereas the trunks drawn by the American subjects are more often rounded. Furthermore, in approximately half of the Bedouin drawings the pencil is used to darken or fill in the body. In some cases an outline is drawn and filled in, in other instances the trunk is formed by repeated longitudinal movements of the pencil which result in an elongated solid area about one-fourth inch in width. Such figures will be observed in the plates. These techniques are seldom used by the American children.

Finally, it is noted that some representations of clothing is present in only 2 per cent of the Bedouin drawings but in 36 per cent of the comparison group. While clothing is usually absent in the Bedouin drawings, it should be noted that this does not mean that nudity is represented. Sexual organs, the nipples, and the navel are never drawn. In other words, the drawings are schematic, not realistic, and the schema does not include clothing.

### E. DISCUSSION AND INTERPRETATION

In describing the experience of the Bedouin relative to art, the following points were developed: the Bedouin seldom sees representations of the human figure, or of animals, or even of objects. His experience with art forms is limited almost entirely to decorations of the face and hands, decorations of tent curtains, saddles, knives, and eating utensils, and to jewelry and coins. These decorations are ordinarily small simple geometric forms. They occupy a small part of the decorated area, and are frequently shaded or colored.

The human figure drawings produced by the Bedouin correspond, point by point, with his art experience. The figures are small, as are the decorative patterns which he sees and produces. The drawings are "poor" in terms of the number of details which earn Goodenough scores, as one would expect from the poverty of exposure to realistic art and the simplicity of his decorative art. In drawing the human figure the Bedouin uses straight lines, which predominate in his art, and frequently makes his figures dark or solid, another characteristic of his art.

The Bedouin's drawing is influenced by his art tradition. The question naturally arises, why should anyone expect any other finding? The answer is that projective theorists appear to hold that personality, not art tradition, determines the content and formal characteristics of human figure drawings. The proposed relationships between personality and drawings often seem to be metaphorical, based on certain characteristics of the English language.

The word "small" is used both to describe a spatial form and certain personal behavior. Therefore, a small drawing is supposed to indicate personal "smallness" or "constriction." Round forms suggest softness. In contrast, angular forms suggest some harshness in behavior. Whether or not interpretations of this kind, which would not be acceptable as metaphors in some linguistic groups, are proposed as universal interpretations by projective theorists is seldom explicitly stated, but neither are the linguistic limitations of the proposed personality interpretations explicitly noted.

Proposed personality interpretations are impoverished in detail, especially

We have shown that Bedouin drawings are impoverished in detail, especially



ally in facial detail. Do these characteristics reflect Bedouin personality? No definitive answer can be given at the present time. Most of our present information about Bedouin personality comes from psychologically untrained persons who have traveled among or lived with Bedouins (1, 4, 5, 8). They usually describe Bedouins as highly skilled in recognizing persons at great distances by noting minute differences in form, dress, and gait. Some are said to be able to derive astounding information about a caravan by observing the tracks left by the caravan's camels. They can recognize each of 100 or more camel brands and a very large number of individual camels. These observations would seem to show that the lack of concern with detail shown by the drawings is not a general trait.

Bedouin drawings are small. Is the Bedouin constrained and inhibited? The Bedouin is said to be generous, communicative, emotionally labile, courageous, independent, and rebellious of restraints. It appears that he is not psychologically inhibited. His small drawings seem to be due to artistic traditions rather than to personality traits.

Our observations suggest that group differences in drawings are much more closely related to differences in artistic experience and decorative skills than to differences in personality but a definitive solution of this problem awaits further research.

#### F. SUMMARY

It was proposed that human figure drawings must necessarily be based upon cultural traditions in respect to art forms and manual skills. The human figure drawings of Bedouins have been examined from this point of view.

Bedouins have very little exposure to realistic art and almost no experience in producing realistic drawings. They do, however, see and make non-representational decorations which are low in detail, geometric in form, simple and small. These decorations consist of surfaces bounded by straight or curved lines and often are shaded or colored.

Bedouin drawings of the human figure were found to conform in several respects with their traditional art. They are poor in detail, earning a mean Goodenough IQ of only 50-55. The drawings are small, averaging only two inches in height. They are made up largely of straight lines and darkened surfaces.

Whether Bedouin drawings reflect Bedouin personality has been discussed. While the present data do not provide a definitive solution to this problem, they suggest a negative answer.

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# A COMPARATIVE STUDY OF THE DIFFERENTIAL EFFECT UPON PERSONALITY OF CHINESE AND AMERICAN CHILD TRAINING PRACTICES\*

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## A. THE PROBLEM

Cultural variations of child training practices and concomitant variations in modal personality of the respective societies have been amply reported in the literature (1, 5, 8, 9, 10). Havighurst and Neugarten (7) have reported a more rigorous research comparing American Indian and white children in this respect. However, Whiting and Child (11), in a cross-cultural study of the affects of child training practices upon resultant personality differentials, have provided a most useful methodology for such a study. The recent experiment of Harlow (6) lends support to the assumption that infant and child experiences of permissiveness (emotional warmth) or severity (emotional coldness) do affect personality to a considerable degree. The results of the more recent research by the Welfare Department of the City of New York (4), in which the accuracy of prediction of the Glueck Delinquency Prediction Scale administered to six-year-olds was amazingly high for this group at their thirteenth year, supports the assumption that the first five years of training have an extremely important influence upon the eventual total personality.

This research, using the Whiting and Child methodology, examined the problem whether the differences in permissiveness or severity of child training practices between Chinese and American middle-class families produced differences in personality in the predicted direction.

## B. METHOD

### 1. *Subjects*

Forty Chinese students enrolled in Oklahoma State University were used as subjects. Thirty-six were born on the mainland of China, three in Malaya, and one on the island of Formosa. Eighteen of the subjects had lived in the United States less than one year, 16 for about two years, and six for more than five years.

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## 2. Procedure

The Chinese students were asked to write about their knowledge of child training practices among their own Chinese families in the five areas suggested by Whiting and Child, namely: Oral, Anal, Sex, Dependency, Aggression. These reports were compared for similarity of description. In most instances, very similar descriptions were obtained. The few individually deviant descriptions in some of these areas were considered to be idiosyncratic variations and not of significance in establishing the cultural pattern. The descriptions were classified independently by three psychology graduate students familiar with the Whiting and Child classifications as being more or less severe than the American middle-class child training practices. The few disagreements were adjusted by joint discussion and consensus.

Cattell's 16PF personality test (2) was then administered to the 40 Chinese students and the results compared with the norms published for male and female American college students.

## C. RESULTS

The results of the comparison of severity of Chinese and American child training practices are shown in Table 1. In interpreting these data, we would predict that the modal personality of the Chinese, when compared with the Americans, can be described as being more withdrawn, more shy, more emotionally insecure, more introverted, more sensitive, more suspicious, more cold and aloof. In a sense, the Chinese would tend more toward the schizothemic rather than the cyclothemic and more so than the Americans. However, we would not expect a difference in compulsivity, curiosity, sociability, or laxity.

The results of the personality test are indicated in Table 2. By applying Cattell's shape correlation (3), we find that  $r_p = .11$ , thus indicating that the shape of the 16 factors of the test for the group of Chinese students does not fit, significantly, the shape of the responses of the group of American students. The difference between the means of the Chinese and American groups for each of the 16 factors was tested for significance by using *t*-test. The results are indicated also in Table 2.

Our hypothesis that, due to the more severe Chinese child training practices in the oral, sex, dependence, and aggression areas, the personality of the Chinese students would tend more toward the schizothemic than that of the American students has been substantiated. Also, they tend to be more withdrawn, suspicious, shy, emotionally immature, sensitive, and introverted than the American students. Our second hypothesis that, due to no difference

in severity of anal training, there would be no significant difference in compulsivity, rigidity of control, nor sociability has been substantiated. The difference in Factor *B* (Intelligent) can be disregarded, since the measure of this factor is entirely verbal analogies in English. Due to the small size and uniqueness of the Chinese group, caution must be exercised in generalizing to the entire Chinese population. We can conclude, nevertheless, that the severity of child training practices, as attested by this group, resulted in

TABLE 1  
COMPARISON OF SEVERITY OF CHILD TRAINING PRACTICES BETWEEN CHINESE AND AMERICAN MIDDLE CLASS FAMILIES

Child training	Chinese practices	Difference from American
1. Oral (Nursing, weaning)		
a. Initial indulgence	Short feeding periods; not cuddled until 4-mos.-old.	More severe
b. Age of weaning	Around one-year-old.	Same
c. Severity of weaning	Bitter substance used; wetnurse (mother) leaves.	More severe
2. Anal (Toilet training)		
a. Initial indulgence	No restrictions.	Same
b. Age of training	Around one-year-old.	Less severe
c. Severity of trg.	Shame after two years.	Same
3. Sex (Modest, sex play)		
a. Initial indulgence	Infant never naked; exploration punished; shame for body.	More severe
b. Age of training	Continuously from birth.	More severe
c. Severity of trg.	Intense shaming; interest in body or sex play punished.	More severe
4. Dependence		
a. Initial indulgence	Needs always gratified; no independent activities allowed.	More severe
b. Age of training	Very late independence; even 12- and 13-year-olds never permitted outside alone; child never alone.	More severe
c. Severity of trg.	Maximum protection; close supervision of activities; never left alone or on own; blind obedience.	More severe
5. Aggression		
a. Initial indulgence	None; respect for and obedience to all those older; even for siblings; quarreling, fighting or killing animals severely punished.	More severe
b. Age of training	Continuously from birth.	More severe
c. Severity of trg.	Belittle self-accomplishments; competition shamed; conflicts and aggressive acts punished.	More severe

a significant difference in personality organization from that of the group of American students.

TABLE 2  
COMPARISON OF MEAN SCORES BETWEEN CHINESE AND AMERICAN STUDENTS ON THE  
"16PF TEST"

16PF factors		Chinese students N = 40		American students N = 604		$M_1 - M_2$	$t$
		$M_1$	$SD_1$	$M_2$	$SD_2$		
A	Sociable	9.50	2.79	9.3	3.4	+0.20	0.43
B	Intelligent	5.60	3.52	8.5	1.9	-2.90	5.16*
C	Mature	15.05	3.29	16.9	3.3	-1.85	3.44*
E	Dominant	15.25	3.51	13.9	3.8	+1.35	2.34*
F	Cheerful	15.90	4.33	14.6	3.5	+1.30	2.10*
G	Persistent	12.25	3.35	12.1	3.1	+0.15	0.28
H	Adventurous	10.90	4.82	12.9	5.0	-2.00	2.54*
I	Sensitive	11.45	3.16	10.3	3.5	+1.15	2.21*
L	Paranoid	13.55	3.06	7.6	3.4	+5.95	8.25*
M	Introverted	12.60	3.34	11.5	3.5	+1.10	2.01*
N	Shrewd, Aloof	12.80	2.92	9.7	2.7	+3.10	6.55*
O	Insecure	10.60	3.86	9.6	3.5	+1.00	1.87
Q <sub>1</sub>	Radical	10.50	2.78	9.7	3.1	+0.80	1.75
Q <sub>2</sub>	Self-sufficient	14.00	3.25	9.4	3.4	+4.60	8.49*
Q <sub>3</sub>	Controlled	10.25	2.65	9.5	2.6	+0.75	1.74
Q <sub>4</sub>	Tense	12.60	4.22	12.1	4.6	+0.50	0.66

\* Significant beyond the .05 level of confidence.

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## INTELLIGENCE TEST PATTERNS OF PUERTO RICAN PSYCHIATRIC PATIENTS\*

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### A. INTRODUCTION

After making a comprehensive survey of race differences, Otto Klineberg in 1935 concluded that "there is no scientific proof of racial differences in mentality. This does not necessarily mean that there are no such differences. It may be that at some future time, and with the aid of techniques as yet undiscovered, differences may be demonstrated. In the present stage of our knowledge, however, we have no right to assume that they exist."

The position of most psychologists with regard to the question of race differences in intelligence differs little from this view in 1960, with the possibility that there is even greater skepticism concerning the likelihood of discovering techniques which will unequivocally demonstrate such differences. Perhaps the racist doctrines of the Nazis generated a revulsion to the doctrine of intrinsic racial mental or physical inferiorities and superiorities, but in addition to this we have learned more about the effects of acculturation, diet, pervasive attitudinal factors, and other variables which influence test findings, with the result that even such taken-for-granted concepts as mental deficiency are being subjected to closer and more sophisticated scrutiny.

In the present study no assumptions with regard to hierarchical levels are being made. We were interested solely in discovering how Puerto Rican psychiatric patients respond to a standardized intelligence test on the assumption that some knowledge of intellectual functioning is necessary even though valid comparisons are not possible with norms obtained from a thoroughly acculturated population (U.S.).

A valid study of Puerto Rican intelligence would have to be based upon equated groups of Puerto Ricans and non-Puerto Ricans carefully matched for age, birthplace, education, occupation, socio-economic level, dominant language in the home, locale, and freedom from brain damage and psy-

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chosis. In the absence of such matching the present study can only be regarded as an exploratory approach to the problem with emphasis upon the face value of the findings.

### B. PROCEDURE

The test records of 59 Puerto Rican patients seen between 1947 and 1959 were examined consecutively for Wechsler-Bellevue patterns and their Rorschachs for the presence of human movement responses. In addition, an estimation for IQ level was made upon the basis of F+, acceptable M's, acceptable W's, and number of responses in accordance with the Abrams formula. All subtest scores were transformed into their IQ equivalents in order to equate scores for age differences. In some of the tests one or more of the subtests had been omitted. There were finally 48 in the Verbal scale group, 49 in the Performance group, and 47 with Full scale IQ's. The 10 subtests ranged from 45 to 49 each. The group as a whole may be regarded as a good cross-section of Puerto Rican patients referred to Psychiatry from other services of a large metropolitan general hospital.

### C. COMPOSITION OF THE GROUP

The mean age of the group was 25.0 years, SD 9.10, range 13 (1 case) to 48. Mean educational level was grade 9.4, with one patient admitting to no formal education, five claiming graduation from high school, and four classifiable as high school, unspecified. Of the 47 individuals in this group 11 claimed from four to eight grades of elementary education, 30 from one year high school to graduation, and four high school unspecified. It is doubtful if these figures for higher than elementary education are reliable, since prestige factors may have contributed to exaggerated educational claims.

### D. RESULTS

The group obtained a mean Verbal scale IQ of 84.29, SD 17.40 as compared with a mean of 100, SD 14.56 for the standardization group. The mean Performance scale IQ was 89.55, SD 20.10 as compared with the mean of 99.79, SD 14.73 for the standardization group. The Full scale IQ was 85.62, SD 19.48 as compared with 99.92, SD 14.67 for the standardization group. It is apparent that the Puerto Rican group as a whole is much more *variable* than the standardization group, a finding which might be attributed to larger numbers and a balanced socio-economic sampling in the latter. One would probably expect more variability in a sampling such as this. Classification based upon the Full scale IQ places

the group as a whole in the *Dull Normal* category and at the 15th percentile for the population norm. It should be noted that 68 per cent of the Puerto Ricans come within the range of the sigma value, namely from IQ 66 to 105. Total range is from IQ 42 to 124. Table 1 shows the subtest means

TABLE 1

Subtest	Mean IQ	SD	Classification
Information	87.32	20.50	Dull normal
Comprehension	96.25	18.30	Average
Digit Span	79.55	20.83	Borderline
Arithmetic	72.65	17.82	Borderline
Similarities	89.50	17.82	Dull normal
Pict. Arrangement	92.50	24.85	Average
Pict. Completion	88.95	23.63	Dull normal
Block Design	83.53	25.16	Dull normal
Object Assembly	86.70	26.48	Dull normal
Digit Symbol	83.65	21.67	Dull normal

for the group. The very high variabilities are impressive and are consistent with the range of scores for each subtest. The following percentages of patients in the mentally defective group and in the high average to very superior range exemplifies this (Table 2).

TABLE 2

	Per cent of patients in IQ 40-69 range	Per cent of patients in IQ 110-129+ range
Full scale	23.3%	27.6%
Verbal scale	20.8%	8.3%
Performance scale	20.4%	22.4%

It is noted that with the exception of Verbal intelligence, which demands familiarity with the language and seems therefore to penalize the Puerto Rican, the chances are about even of finding individuals in the extremes of either the mental defective or high average to the very superior category. In this respect it is notable that in a study of the social adjustment of Puerto Ricans in Philadelphia, Siegel (9) found that of 102 individuals interviewed 50 per cent replied they understood "little" or "no English" and 50 per cent spoke "little" or "none." More significantly, 82 per cent of those who knew little English never spoke it to their children, while 46.8 per cent of those who claimed to speak it well never used it in their contacts with their children. It would therefore seem that familiarity with the English language is not fostered in the home. This may account for Gerhard Saenger's (8) report on commitments to State Institutions for Mental Defectives in New York state in which he notes that four times as many Puerto Ricans



as whites and twice as many Puerto Ricans as Negroes are committed to such institutions. This runs counter to biological expectations as far as defective germ plasm in any group is concerned and indicates that uncultured neurotics, character disorders, and psychotics are probably being committed to such institutions.<sup>1</sup>

Percentage distributions in the extremes of the range for subtests are shown in Table 3.

TABLE 3

N	Subtest	Per cent of patients in IQ 40-69 range	Per cent of patients in IQ 110-129+ range
46	Information	28.2%	23.9%
47	Comprehension	19.1%	21.2%
47	Digit Span	40.3%	12.7%
47	Arithmetic	38.2%	4.1%
48	Similarities	18.7%	18.7%
47	Picture Arrangement	14.9%	23.4%
49	Picture Completion	18.3%	22.4%
48	Block Design	31.2%	20.8%
45	Object Assembly	17.7%	31.1%
48	Digit Symbol	22.9%	10.4%

If the subtest IQ means are interpreted in conjunction with the percentage distributions in the classification extremes certain *tentative* conclusions might be reached, keeping in mind the smallness of the sample. It can be concluded that the Puerto Rican psychiatric patient is able to adapt to the environment by utilizing common sense formulations of everyday situations in conjunction with within-normal-range grasp of social sequences which enable him to make adequate social anticipations. Anxiety interferes with his attention and concentration functions. Putting aside specific interpretations of subtests and utilizing Cohen's (3, 4) factorial analysis of the Wechsler, it can be shown that the Puerto Rican's Verbal Comprehension is at the low average level (IQ mean 90.94, SD 18.87), his Perceptual Organization is in the dull normal range (IQ 84.62, SD 24.43), and his Freedom from Distraction is at Borderline level (IQ 76.10, SD 23.71). Marked susceptibility to anxiety is evident, although this may well be a characteristic of psychiatric patients in general.

<sup>1</sup> It is interesting to note that Howell, Evans, and Downing (6) examined 50 Navajo males and 50 females in the 16-17 year group by means of the WAIS. They obtained a V.I.Q. of 84.01 (ours 84.29); P.I.Q. 95.35; and F.S.I.Q. 88.54 (ours 85.62). Better BD and OA than in the standardization group accounts for a higher performance rating, but in general the level of superstition and poverty might be similar. In contrast to this, an unselected group of 50 non-Puerto Rican psychiatric patients yielded a W-B Verbal scale IQ of 108.26; Performance scale IQ 108.48; and Full scale IQ 109.08.

In an attempt to estimate latent intellectual potentialities the Abrams Rorschach formula was used ( $2F + \% + 17M + 9W + 2R \div 10 + 76$ ). Although Fielding and Brown (5) found that intelligence cannot be evaluated reliably by this means for Borderline patients, those brighter than IQ 110, and those with M inhibition in the Rorschach, it is possible that the low correlations between the formula and Wechsler-Bellevue IQ's might be reflecting psychic impairments. Since the presence of marked anxiety in this group as reflected in the Freedom from Distraction variable would be expected to inhibit M and reduce productivity and even the form-accuracy level ( $F+$ ), average or better scores under these conditions might provide an indication of a trend at the very least.

Utilizing this formula, a mean estimated IQ of 103.05, SD 8.06, was obtained. The variability is very low by comparison with the Wechsler subtest IQ equivalents and may represent a more constricted and hemmed-in personality structure. In any case, a potential for average intellectual functioning is indicated.

If the human movement response (M) is computed for the entire group of 56 cases, the mean is 2.16, SD 1.41. This is not grossly discrepant with Beck *et al.*'s (2) mean of 3.50, SD 3.24 for 157 "normal" Chicago whites. However, if four extreme cases which distort the mean are excluded (with a mean of 10.2 M's, 32 per cent scored minus and therefore representing overideational fantasy-ridden autistic patients) the mean for the group drops to 1.53 M, SD 1.19, which is quite low. The difference is even greater when compared with Neff and Glaser's (7) findings on M means for 50 normal applicants for vocational guidance (M 5.8, SD 4.3) and 41 who were diagnosed as neurotic (M 4.9, SD 4.5). The contrasts are consistent with the assumption of psychic constriction for this group.

#### E. SUMMARY

A sample of Puerto Rican psychiatric patients was evaluated for intellectual level and functioning by converting Wechsler-Bellevue subtest scores to IQ equivalents and computing means and standard deviations. Verbal, Performance, and Full scale IQ's were taken directly from the test protocols. The number of cases for each subtest ranged from 45 to 49.

It was found that that group as a whole was classifiable as of Dull Normal intelligence when compared with standardization norms, but that there was as much chance of encountering a patient in the high average to very superior range as in the mentally defective range for the Performance and Full scales. This vitiates any hard and fast generalizations with regard

to Puerto Rican intelligence. As a group they are much more variable than members of the general population.

Subtest analysis reveals a significantly low threshold for anxiety as reflected in a Borderline rating for the factor designated as Freedom from Distraction by Cohen. Verbal Comprehension is at the low average range and is aided by average sensitivity to social sequences as a resource in dealing with social situations. Perceptual organization is at the Dull Normal level and may also reflect anxiety.

The estimated IQ mean of 103, based upon Rorschach determinants, suggests a potential for average intellectual functioning at the very least and despite a constrictive hemming-in as reflected in low production of human movement responses.

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## CONTEXTS FOR THE STUDY OF CROSS-CULTURAL EDUCATION\*

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In recent years there has been increasing research in the field of cross-cultural education, more particularly studies of foreign students in the U. S.<sup>1</sup> These studies have provided a considerable store of empirical data about the changes that occur in the attitudes of students who visit a foreign country for purposes of study. A number of hypotheses have also emerged about the process of learning and adjustment in the cross-cultural situation.

The further advances in the study of this subject will depend upon placing it within conceptual contexts linking up with broader theory. At the same time the cross-cultural situation provides, as we will see, a strategic vantage point for the study of a number of processes of interest to the social scientist.

### A. THE DEFINITION OF CROSS-CULTURAL EDUCATION

We shall define cross-cultural education as *the changes in perception, in evaluation, and in action occurring in individuals socialised in one culture as a result of their sojourn for educational purposes in a foreign culture.* This definition implies a number of foci for the analysis of cross-cultural education.

(a) The fact that the host-culture is "foreign" means that the student enters a situation which is new to him. The "cognitive maps" which he has learned in his home-culture are no more veridical. This would, of course, also hold true for an immigrant in his first period in the new country. The student's sojourn, however, is limited in time. While for the immigrant the "newness" of the situation is confined to a period of transition which is brief relative to the total period of his stay in the country of immigration, for the student this period of newness occupies a prominent place relative to the total duration of *his* stay. This not only means that a thorough

\* Received in the Editorial Office on June 20, 1960, and published immediately in accordance with our policy of special consideration for cross-cultural research.  
<sup>1</sup> A comprehensive bibliographical listing of such studies is appended to the reviews of cross-cultural education by M. Brewster Smith (19) and by Lesser and Peter (11).

analysis of the cross-cultural process must include a study of this part of student's sojourn, but also that the psychological effects of the new situation may remain in force during all of the sojourn; thus, the student's behavior even at a late stage of his stay may be influenced by events and responses occurring during the initial period of newness.

(b) The student is exposed to the norms of the host-culture during his *sojourn*. The norms are conveyed by social entities with whom the student interacts and whom he can observe at first hand. Thus it becomes necessary to explore the nature of the encounter between the student and the individuals and groups in the host-society who directly or indirectly transmit the norms of the host-culture to the stranger.

(c) The fact that the student has been *socialized in values different from those of the host-culture* means that the sojourn will give rise to situations of conflict between home-norms and host-norms. Unlike the tourist, the student is compelled—as Brewster Smith (18, p. 4) has pointed out—to reach a “modus vivendi” with the host-culture for the duration of his stay. On the other hand, unlike the immigrant, the student contemplates a return to the home-culture. He is more likely than either tourist or immigrant to find himself in a series of “overlapping situations.”

(d) Influencing the entire course of the cross-cultural process is the *orientation* of the student to his sojourn, implied in the definition by “for educational purposes.” It would have been more accurate to have said: “for ostensibly educational purposes,” because not always does the avowed educational intent exhaust the motivational aspects of the student's approach to his sojourn. Other considerations may weigh more importantly with him than the specific academic aims. Furthermore, whatever the student's goals for his sojourn, the period for the achievement of these goals is always limited. The student's approach to his sojourn is predicated upon the eventual return to the home-country, and this time-perspective will influence his behavior throughout the stay.

(e) The analysis in terms of these four foci of the definition provides an understanding of the background against which “*the changes in perception, in evaluation and in action*” can then be explored. This working of the fifth focus of our definition indicates the possibility of viewing cross-cultural education as a particular instance of reeducation.

It seemed to us that the study of cross-cultural education would gain in significance by placing it within the contexts to which we have just referred. And it was with the object of viewing cross-cultural education within these

broader conceptual frameworks that an analysis of the stay of American students in Israel studied by us was carried out.<sup>2</sup>

## B. THE METHOD

A study in cross-cultural education is a study in change occurring over what may be a considerable period of time. Hence the appropriate method would be a panel study, with starting-point *prior* to the cross-cultural experience, one or more inquiries *during* the sojourn, an inquiry at the *termination* of the sojourn, and a *follow-up* at one or two points after the return to the home-country. In the present research it was found possible to begin the study of the entire group of students on the eve of their departure from the U.S. in August, 1955, to maintain close contact with them throughout the period of their year-long sojourn in Israel, and to restudy them in March, 1957, six months after their return to the U.S.

The first questionnaire was administered in New York. A further questionnaire was given shortly after arrival in Israel, a third at the end of five months, a fourth at the end of the year's sojourn in Israel, and the fifth at the end of six months back in the U.S. In addition 15 of the 60 randomly selected for intensive interviewing which took place after the administration of the second, third, fourth, and fifth questionnaires. These 15 students were furthermore divided into two groups, and the individual interviews were supplemented by group interviews at the various stages of the sojourn. A number of students also wrote essays on their sojourn in Israel. Several of them made diaries they had kept available to one of the authors of the study. Correspondence was maintained with some of the students into the second year after their return.

The number of students in any given cross-cultural project will frequently be small. In many cases, however, similar groups of subjects arrive at regular intervals to undergo more or less identical experiences. It would then seem desirable to replicate the study, or parts of it, on subsequent groups. In this respect our study was fortunate as similar groups of American students come to Israel each year. It was therefore possible to replicate some of the questions and also to develop further points of interest suggested by the preliminary findings of the study of the original group.

There was a dimension of difference between our study and other studies of cross-cultural education. These were Jewish students with a special position in the structure of the home-society as members of a minority group,

<sup>2</sup> The study of American students in Israel is in the course of preparation for publication.



and at the same time they as Jews had a special involvement in the host-country.

The focus in our study was less the formal, academic learning within the confines of the educational institute, and more the reactions to the wider social milieu.

### C. THE NEW SITUATION

In our analysis of the definition of cross-cultural education we drew attention to the importance of seeing the student as a person in a new situation. There are two problems of special interest in this context: (a) What characterizes the process of perception of the new situation? (b) What are the effects of the new situation on the student's actions?

#### 1. *Differentiation and Organization*

*a. Differentiation.* A new situation is characterized by a lack of differentiation. In field-theoretical terms—the regions which compose the psychological environment are few and large and there is no clear demarcation of boundaries. The result is that satisfaction or frustration related to a given region often crosses over to other regions. Furthermore, the source of a given event is often not particularized. This explains in part the sweeping generalizations of the tourist describing the impressions of a fleeting visit. And so with our students, the courtesy experienced at the hands of a particular taxi-driver in Jerusalem could variously lead to the attribution of the quality of courtesy to "taxi-drivers" in general or to "Jerusalemites" or to "Israelis."

With the passing of time the newness of the situation decreases. But even after a certain measure of differentiation began to set in, boundaries between regions were not always firm, their valences "leaked," and there was contamination of one region by its neighbour. The continued spreading of satisfaction or dissatisfaction about one aspect of the country's life to another was evident even after the students had been in Israel for some time. Our findings show that even after a year's stay a positive correlation remained between satisfaction with experiences in one region and satisfaction in other neighbouring regions.

There are indications of a similar effect in a cross-cultural study by Lysgaard (14). In interviews with Norwegian Fulbright grantees who had returned from a sojourn in the U.S. he found that in each of two broad areas satisfaction was "generalized" from one item to another. Lysgaard indicates that the generalization does not reflect any personality trait of the subjects but seems to be due to "characteristics of the person

in the situation." We would interpolate "new situation," and would submit that Lysgaard's findings could well be analyzed in terms of the relative lack of differentiation and the consequent "spreading" of impressions.

b. *Organization.* The differentiation which increases with time may be accompanied by organization<sup>3</sup> of the impressions around a few key-elements; a few dominant items determine the organization of the experience as a whole. Thus, in assessing the outcomes of the sojourn, it is not essential to study the entire welter of impressions experienced by the students; it is important rather to pinpoint those dominant items which will determine the final pattern of impressions.

This process of organization, however, may be delayed by the tension frequently accompanying the experiences which provide the possibility for differentiation and organization.<sup>4</sup> Thus in a given period the student may receive new percepts without organizing them and then after a while (possibly after the return home) a rapid organization may take place of the percepts acquired over an extended period of time. In our study the students themselves seemed aware of this gap between the absorption of information on the one hand and the organization of the new information on the other. They stated that new impressions kept "pouring in," and they could not "sort them out" properly, that they needed an opportunity "to sit back" and "think it all through."

The problem of organization has a bearing on what constitutes an "optimal period" for the sojourn (5; 21). What is regarded as an "optimal period" will depend on whether the emphasis is on the process of learning or on the process of adjustment.<sup>5</sup> If the focus is primarily on the effectiveness of the learning process, the determination of optimal duration must take into account the stage reached in the process of organization.

## 2. *The Function of the "Stranger" Group*

The person in a new, unstructured situation will seek cues indicative of direction. He will be more dependent on the opinion of others as to what constitutes reality. Furthermore, being on "soft," unstable ground, he will

<sup>3</sup> Lewin advocates the use of the term "organization" rather than "integration" in order to avoid any implication of dedifferentiation (13, at p. 101).

<sup>4</sup> "The stronger the tension, the stronger the emotional 'tone' of the situation, the less likely that cognitive reorganization will occur" (10, at p. 141).

<sup>5</sup> In terms of adjustment the optimal period would be that which allows for adjustment to the country of sojourn without being of such duration as to result in alienation from, or otherwise hamper readjustment to, the home-country. This consideration may dictate an earlier termination of the sojourn (e.g., before organization takes place) than is warranted from the point of view of the effectiveness of the learning process.



be in need of the security which acceptance into a group can give. It follows that the perceptual state of "newness" of the situation may have consequences *beyond* perception. Forces towards gaining security and information are aroused. And if, as here suggested, the "new situation" is so major a factor in the student's sojourn, then these forces should also influence the way in which he learns.

This way is not always the most functional one. On the contrary, the intensity of the forces towards security and information may lead the student to sources which are easily available but which are not necessarily those providing the most veridical information.

While the home groups because of their distance from him cannot fulfil their usual functions of verification and social support, it is not easy for him to gain acceptance in the groups he meets in the host country. And he therefore turns to the groups of students—in our case his fellow-Americans—with whom he arrived. Whereas Israel groups are part of the unfamiliar new situation, his fellow-Americans represent the familiar. They have the same background and are passing through the same experiences as he.<sup>6</sup> The credibility of Israel sources of information may be suspect; indeed some of the students predicted on arrival that there would be attempts by Israelis to "convert" or "propagandise" them. The student has no such suspicions against his fellow-Americans. In our study this became the group through which the new impressions were filtered, and it also became a group developing standards of its own, generally in favour of the host-country and sometimes at divergence from the standards of reference groups in the U.S.

Thus in all phases of our study we found that the "stranger" group played a crucial part in the development and maintenance of the students' attitudes. And it would seem that in any study of cross-cultural education considerable importance attaches (a) to the presence or absence of such group of fellow-strangers to whom the newcomer can refer, and (b) to the norms, favorable or unfavorable to the host-country, developed in such group.

#### D. A STRANGER IN THE HOST SOCIETY

Our definition indicated that the learning of the new situation takes place in the course of the encounter of the student with his hosts. In this encounter the student's position is that of a "stranger" (22, pp. 403-408; 23), and as a person in this position it becomes of crucial importance to him to learn the norms of the host society. The norms and role-performances are

<sup>6</sup> The position of the student here is comparable to that of the adolescent entering the adult world. The adolescent turns to his peer-group.



less "visible" to him than they are to members of that society (15, pp. 336-353), and he is not clearly aware of the range of permissible deviations. The extent to which the encounter enables the student to learn the norms of the host society is thus decisive for his adjustment. It is therefore essential to inquire into the nature of this encounter and the way in which the learning of the student proceeds.

We may say that the stranger either may *be told explicitly* what are the norms, or he may *infer* them; his inference may either derive from his *own interaction* or it may be on the basis of his observation of the interaction between others. Thus we arrive at three forms of learning: Firstly, he may be told explicitly by his hosts what their norms are. Secondly, he may infer them from the cues given him by the hosts in their interaction with him. But his learning is not exclusively dependent on contact in the sense of direct interaction: the stranger avails himself of a third form of learning when he infers the norms of the host-culture from his observations of the hosts' interaction among themselves.

We see it as the task of a study of cross-cultural education to clarify the relative importance of these three forms of learning. While observation always is available to the stranger, the first two forms of learning depend on the ease with which contact (in the sense of interaction) is established between him and the hosts, and on the extent to which the contact does in fact include explicit communication or offers sufficient cues to allow for inference. But even when the *opportunity* for acquiring information is provided, this is not sufficient per se to produce a change in perception and values. Hence it is necessary to inquire into the effectiveness and limitations of the three forms of learning in making the information *accepted* by the stranger.

We believe that a distinction in these terms will help to clarify the part played by social contact in the cross-cultural experience.<sup>7</sup>

### 1. *Opportunity for Learning Through Contact*

a. *Establishment of contact.* There are different ways of establishing contact in different cultures and this fact may be a barrier to the possibility of interaction between stranger and hosts.

Lewin, in his analysis of the social psychological differences between U.S. and Germany, has pointed out that "the average social distance between different individuals seems to be smaller in the U.S. so far as the surface

<sup>7</sup> For an important analysis of the problems of social contact, with particular reference to the cross-cultural situation, see Cook and Selltiz (6).

regions, or as one may say, the 'peripheral regions' of the personality are concerned. That means the American is more willing to be open to other individuals and to share certain situations with other individuals than the German . . . The American seems more friendly and more ready to help a stranger" (12, p. 18).

The American students in our study expected that the contact with the Israelis would be established as easily and smoothly as is customary in the U.S. Israelis, however, do not initiate contact with strangers with the relative ease with which Americans do. Although they on the whole were friendly, they usually did not go out of their way to initiate contact. On the other hand, the students, who saw themselves as the guests and the Israelis as the hosts, waited for the Israelis to take the initiative.

Thus the expectations of the students were disappointed. The students were aware that in coming to Israel they were coming to a people with a cultural background differing from that of Americans. But what they did not adequately grasp was that the very process of getting acquainted and becoming socially accepted among this people differed from that to which they were accustomed in the U.S.

We may reverse this finding and suggest that in the initial stages of contact the position of a foreign student in the U.S. where Americans are the hosts may be easier than that of the American in a number of foreign countries where a discrepancy exists between the American's expectations about easily-establishable contact and the culturally-conditioned reserve of his hosts. On the other hand, it would seem that the foreign student in the U.S. is often at a loss to understand why the contact so easily established—with the expectations of friendship it arouses—does not readily progress beyond the "peripheral regions."

*b. Differential attitudes of sectors of host-society.* When the contact is established, the stranger's learning depends on the extent to which the host-party to the contact offers him the opportunity for learning by providing direct information on host norms or by providing cues that allow for inference. This will in turn depend on the hosts' attitude to the stranger and may differ greatly from sector to sector in the host-society.

The attitude of any sector of the host-society towards a stranger may be defined by two facets: (a) the extent to which that sector is *desirous* of accepting the stranger, (b) the extent to which the sector is *ready* to accept the stranger. The first facet concerns *active* contribution on the part of the group towards the absorption of the stranger; the second facet concerns the *passive* readiness of the group. Three types of groups may then be



distinguished; the "open" group, which not only is ready to accept the stranger but by itself initiates contact and encourages his absorption; the "indifferent" group, which is prepared to accept the stranger if he takes the initiative but leaves it to him to overcome any barriers; the "closed" group, which is disinclined to accept the stranger.

The readiness of the group to accept the stranger seems predictive of the range of deviation permitted him qua stranger; the desirousness seems predictive of the extent to which the stranger's conformity to the group-norms is rewarded. As range of deviation and rewards for conformity influence learning of the norms, the attitude of the sector is thus of considerable importance in determining the stranger's opportunity for learning.

Usually the stranger will at any given time be in contact with a multiplicity of host-groups which may have highly differential attitudes. The students in our study, however, at one stage of their sojourn went to work in agricultural settlements; it was possible to classify these settlements as "open," "indifferent," and "closed" and thus to test the above hypothesis. The data indicate that the attitude of the host-group does indeed influence the stranger's learning (and, incidentally, also the cohesiveness of the stranger group).

## 2. *The Stranger's Acceptance of Host Communication*

The circumstances under which the communications of the hosts are accepted merit fuller exploration in studies of cross-cultural education. We may suggest that the probability of acceptance of the communication will be highest in regard to topics where the stranger most strongly feels lack of knowledge, where the communicator is perceived as similar in background to the stranger and where the communicator is seen as disinterested, i.e., as having no desire for converting the stranger. Our own findings show that:

(a) Whilst the views of the hosts on Israel affairs were frequently accepted, their views on values of the home-culture were often treated with disdain. In these spheres the hosts are seen as less qualified than the strangers to express an opinion, and the opinion when expressed was treated as coming from an "outsider." When the opinion took the form of criticism of American life or character, it provoked defensive reactions.

(b) In regard to matters of relevance both to America and Israel (such as the immigration of Jews from the U.S. to Israel), the students were most prone to take into account the views of a sector of the host-society of similar background to their own—American Jews settled in Israel.

(c) The influence was more effective when the communication took place



in circumstances indicating no premeditated influence attempt on the part of the host.

### 3. *Learning by Observation*

The sojourn of the stranger is crowded with impressions of the host society—whose operations are new to him at a multiplicity of points—and direct interaction with the hosts covers only a limited segment of these impressions. Even within this segment there are—as we have seen—limitations to what and from whom he is prepared to learn. Thus the third form of learning, “by observation,” assumes considerable importance, possibly greater than that of “social contact” in the sense of explicit messages or cues provided in the course of interaction. By their observations of the host-society the students learned what were the actual norms and permitted deviations—rather than merely official ideology. They also appeared in this way to learn the “mood of the people” and “the general climate of opinion.”

Not only did the greater number of impressions come through observation but the students seemed more open to influence by what they saw of their hosts-in-action than by what the hosts told them. An extreme example occurred in our study where the *absence* of a teacher called up for military service in a crisis made a deeper impression on the students as an exemplification of the spirit of the people than his daily communications to them.

## E. OVERLAPPING SITUATIONS

The visiting student may be seen as a person in a series of overlapping situations, i.e., he is located within the common part of two or more psychological situations which exist simultaneously. The “overlapping situations” arise particularly as a result of the student’s referring simultaneously to different groups with different norms, and this conflict between competing reference groups is a crucial element in the cross-cultural experience (21). Frequently the conflict expresses itself in a *role-conflict*, i.e., the student alternates between ethnic roles anchored in different ethnic reference groups. In the present discussion we shall analyze the overlapping situations in terms of this ethnic role-conflict.

### 1. *Role Conflict*

In our study the students frequently moved from one ethnic role to another. They were Americans, they were Jews, and they were temporarily—and sometimes planning to be permanently—members of Israel groups. Whilst thus simultaneously belonging to these ethnic groups, they were at the same

time, as previously stressed, in a new, unfamiliar situation where the cues were not easily discerned or interpreted, or even seemed to call for more than one role being played. What the behavior of the student will actually be depends upon the relative strength, or relative potency, of the dissonant roles in such overlapping situations.

Our study leads us to the view that the relative potency of an ethnic role should be seen as a function of two situational components—the valence, or desirability, of one role relative to the other, and its relative salience, its momentary prominence in the cognitive field, in the sense of the “figure” against the “ground.”

The pioneering experimental studies on the subject of the salience of groups are those by Kelley (9) and by Charters and Newcomb (4). After heightening the awareness of their subjects of their membership in a specific group by vivid reminders of such membership, the experimenters investigated the effects of the increased salience of the particular membership group in the given situation in producing change or resistance to change. These two studies represent a beginning, and in general the implications of increase or decrease in salience in the modification of attitudes merit further systematic study. It would seem to us that the study of cross-cultural education is par excellence a study of the changing salience, as well as valence, of reference groups in the home and host countries.

In our exploration of the determinants of salience of ethnic roles in the cross-cultural situation,<sup>8</sup> we have suggested that they be analyzed by three facets:

(a) The *source* of the salienting factor, which may either be a “behavior setting”<sup>9</sup> or may be found in the interaction—as distinct from the extra-individual quality of the behavior setting—which occurs between the actor and others in his environment.

(b) The psychological *process* by which the salienting occurs. The perception of a phenomenon may in itself salient the role to which the percept is related; by its very occurrence the phenomenon coerces the role into prominence. The phenomenon may, however, also serve the perceiver as basis for comparison; it is associated and compared or contrasted with another phenomenon which then is saliented.

<sup>8</sup> We have described these determinants—as tentatively mapped out by us—more fully in a separate article “Ethnic Role Conflict in a Cross-Cultural Situation” (in preparation for publication).

<sup>9</sup> A behavior setting is defined by Barker and Wright (1) as a standing behavior pattern together with the non-psychological context in which it is anchored. Persons entering a behavior setting perceive it as appropriate for certain kinds of behavior.

(c) The *region* in the perceptual field which is the one immediately *saliented* the role region may be saliented either directly, or there may be a two-step process, i.e., the salienting of a neighbouring region in the perceptual field may "induce" increased salience of the role region itself. The extent of induction is dependent on the proximity of the region saliented to the role-region (10, pp. 102-104).

## 2. *A Compromise Role*

In the situation of cross-pressures in which the student finds himself it may be often be functional to assume a "compromise role" which is a legitimate role in its own right and includes parts of both of the conflicting roles.

Stouffer has pointed out that in cases of role conflict one possible course of action is for the person to "seek a compromise position by which he attempts to conform in part, though not wholly, to one or more sets of role expectations in the hope that the sanctions applied will be minimal" (20, p. 707). The assumption of the Jewish role was particularly functional in the overlapping situations in which the students in our study found themselves in Israel. To take the Israel role often meant to reject the American one, and vice versa. On the other hand, the Jewish role—apart from whatever other reasons existed for its assumption—allowed for preserving the link to America as well as to Israel. Thus, in cases of cross-pressures where the potency of the American and Israel roles approached equality, the students tended to adopt the Jewish role. There was minimal loss associated with taking this "compromise" role.<sup>10</sup>

## 3. *Stabilization of Identity*

The crossing of national boundaries, the often unexpected contrasts in national characteristics, and the frequent need to appear in a representative role vis-à-vis the foreigners among whom they sojourn creates in visiting students an awareness of a nationality which they may hitherto have taken very much for granted as part of the air they breathe (16).

In the peculiar situation in which the students in our study found themselves as American Jews in Israel they were confronted with a series of inescapable challenges for self-definition. They had come from a society in which as Jews they had minority status into a setting where Jews were the

<sup>10</sup> Cf. 11, p. 191. "A factor which is likely to reduce the intensity of the conflict is membership in a third group, such as a business organization, a fact which lessens the strain of overlapping membership of two national cultures. To a considerable extent the trainee so situated may remain within the culture of the third organization—which provides a transition between the two national cultures."



majority and were subject to no disparagement for being Jewish. They saw themselves in a new mirror. As Erikson has pointed out, the sense of ego identity develops out of a gradual integration of all identifications (7, p. 213). The ethnic group identifications are a particularly crucial constituent of the ego identity of members of a minority group. Our study found that an important outcome of the sojourn in Israel was a clarification and stabilization of the ethnic elements in the identity of the students.

#### F. THE ORIENTATION OF THE STUDENT

The goals the student has defined for his stay—or which he defines during the sojourn—will affect most phases of his cross-cultural experience.

a. *Time-perspective.* But whatever the specific content of the student's goals, it is common to all participants in cross-cultural education that their goals are relevant for a limited period only. Their time perspective is that of a limited stay and eventual return to the home-country. We have already mentioned that the contemplation of return increases the possibility of the student being in "overlapping situations." Time-perspective also influences the perception of the host-country. Situations which may be highly disconcerting to the immigrant, may be amusing to the student who knows that the discomfort is temporary. Thus the students in our study pointed out that the lack of privacy or the hard work at the kibbutz (collective settlement) might have been a serious annoyance, had they not known that this way of life for them was of limited duration only. They adjusted to the strains "as if it were at a summer camp," and what was salient was the interest in a new kind of experience rather than the discomfort.

This time-perspective also allowed the students to postpone decision-taking on several problems. When interviewed on their attitudes to a number of issues, some of the students replied that they "would make up their minds when home," supposedly free of the pressure of the constant stream of new impressions. It may well be that had the students not felt it possible to postpone taking a stand, the organization of the cognitive structure would have taken place at an earlier stage, that is, *during* the sojourn.

On the other hand the time perspective created considerable impatience in regard to other issues, such as sight-seeing and contact with hosts. Here motivation was strengthened by the awareness of the fleeting nature of this opportunity for personal observation and interaction.

b. *The student as participant.* A further characteristic common to students in cross-cultural education is that their position is that of recipients. Although the student may actively seek out experiences, he is still a listener

and receiver rather than a doer and giver. Frequently this is accompanied by a considerable degree of constriction of the student's life-space, particularly if previously he had been engaged in some field of activity in his home country as had the students in our study. In this position of relative passivity and dependence—and at times of reduced status compared to what had been accorded to him at home—tensions are engendered which may impair the learning process.

On the other hand, if the student can become an active participant or helper in the host-country, the conditions for effective learning and adjustment improve. The students in our study expressed greatest satisfaction with their stay, drew closest to Israelis, and reported that they learned most when called upon to aid new immigrant settlements as teachers or youth counsellors.

### G. CROSS-CULTURAL EDUCATION AS REEDUCATION

A before and after study in the field of cross-cultural education, involving as it does the movement of individuals from the total environment in which they have been socialized to a sharply different environment and then a return to the original environment, would be expected to afford special opportunities for investigating the process of changing perception, evaluation, and action, i.e., the process of reeducation.<sup>11</sup> Although in our study the pattern of impressions was organized only after the return to the home country, numerous changes occurred during the period of sojourn.

#### 1. *The Process of Change*

*a. Values and valences.* Lewin (12, p. 59) distinguishes between three "levels" of change: changes in cognitive structure, in values and valences, and in action, and points out that, although these levels are interrelated, the mutual influence is far from perfect: change on one level does not inevitably lead to change in another level.

In regard to *values*, it could hardly be expected that values acquired over years of socialization should readily change during a brief sojourn in a foreign land. It might be thought that because of their involvement as Jews in Israel the students in our study would undergo more value changes than in cases where students come to a country with which no such relationship exists. But even here the changes in values are relatively few.

Nevertheless, changes in *valences*—evaluations—were very much in evidence. Thus, for example, more favorable attitudes to Israel and to Zionism developed. The changes in valences could frequently not be ascribed to

<sup>11</sup> Our study gained much from the analyses of the process of reeducation by Lewin (12, pp. 56-68) and Cartwright (3).



value-changes, because the values relevant to the changing attitudes remained constant. We must therefore look to a different source for the determinants of valence-change. We shall suggest that changes in evaluations produced by the cross-cultural experiences frequently may be due to changes in cognitive structure.

*b. Cognitive structure.* The principal changes found in our study were on the cognitive level. But even on this level there are stereotypes about the host-country which the students bring with them and to which they tend to cling. Thus the students in our study come with an idealized picture of "Israelis," and looked around for Israelis fitting into this picture whilst regarding others as unrepresentative. The Group Stereotype Test administered to the students before, during and after the sojourn showed that with increasing contact with Israelis some changes took place, but not of a substantial kind. But in general the cognitive structure underwent considerable change. [This change did not only take place in the cognition of the host-country, but also in that of the home-country (cf. 21). At numerous points the country of sojourn came to serve as a source of comparative reference resulting in the students acquiring a different "perspective"<sup>12</sup> on various facets of the home environment thus saliented.]

The question now is of the *ways* in which the cognitive structure changes—and in particular whether the cognitive changes can explain the occurrence of changes in evaluations when the relevant values remain constant.

We have already indicated that the problem of changing salience was crucial to an understanding of "overlapping situations." We now suggest that it equally is a key-concept in the analysis of changes in the cognitive structure; a study of cross-cultural education must take into account the effect of the changing salience of features of the host-country once viewed from afar and now experienced at first-hand.

The psychological regions in which the host-country may be analyzed are (or become) differentiated in subregions. The region of "life in a collective settlement" includes subregions such as "life of equality," "privacy," "agricultural work." Each of these subregions has a valence of its own—"life of equality" may be evaluated positively, while "agricultural work" may be evaluated negatively. The total valence of the region is then determined by the valences and *salience*s of the subregions: the higher the salience of a subregion, the greater the weight of its valence in determining the valence of the total region.

<sup>12</sup> "A perspective is an ordered view of one's world—what is taken for granted about the attributes of various objects, events and human nature" (17, at p. 564).



The changes in the salience of the subregions will usually not be uniform—some subregions will gain or lose more in salience than will others. Thus, even if the valence of each subregion remains constant, the valence of the total region changes, and a perceptual process brings about a change in evaluations.

This process was exemplified in our study by the valuation of life in a kibbutz. There were some students who after spending a period in a kibbutz looked upon this form of settlement with less favor than before their coming. Their support of the communal ideology remained unaffected, they still found the security offered by the kibbutz attractive, but what happened was that another of the subregions, most frequently the "lack of privacy," of which they may have known abstractly before and even then viewed with disfavor, assumed heightened salience in the light of their own experience of life in the kibbutz. "I never really thought about it" was a characteristic remark in regard to such subregions whose valence, positive or negative, remained constant but which now gained strongly in salience and hence produced a change in the evaluation of the region as a whole.

Thus, in our study changes in the valence of regions were mainly brought about by changes in the salience of subregions—and less so by changes in the valence of subregions.

In treating problems of change in the cross-cultural situation in terms of changing salience a link is established with studies in the field of perception. A suggestive example of the possibilities inherent in this link is provided by a recent study by Bruner and Perlmutter (2).

*c. Action.* During the period of the sojourn there has necessarily to be conformity to certain of the behavioral requirements of the host-society. This means changes in matters such as dress, food habits, manners. But those were temporary, expedient adjustments to the demands of the immediate environment and there was no need to retain them—and they were not retained—on the return home.

In regard to changes in action in the home environment, it was found in our study that upon their return a number of students—in whom cognitive and evaluative changes had been previously discerned—joined Zionist groups, in some cases groups with the avowed aim of settling in Israel. Several of the students subsequently came to Israel as settlers.

## *2. Forces Towards Change and Barriers Against Change*

We have viewed the levels at which the process of change occurs, and we now turn to the nature of the psychological forces leading to reeducation.

Reeducation is not simply a question of inducing appropriate driving forces towards change; barriers against change exist. Furthermore, any factor which does not act in favor of change, may act against it.

Our study provided a case in point in the attitude of the students towards future settlement in Israel. Three sets of factors were distinguished as determining the change in this attitude: (a) The initial attitudes of the student which influence his selection and interpretation of the elements in his new experience. (b) The satisfaction (or lack of it) with the experiences in the new environment. (c) The reference (or absence of it) to groups in the new environment, in our study particularly reference to the "stranger" group.

Change is greatest when all three factors operate in the same positive direction, i.e., the student arrives favorably disposed towards the host country, the experiences of his sojourn are satisfying, and the norms of the group in which attitudes are anchored are favorable towards the new country.

The absence of a factor does not only mean that in this regard no forces are working towards change; it also means that there actually exists a barrier against change. The individual tends to avoid cognitive reorganization; hence if the environment itself does not induce forces towards change, there is a barrier against change. Similarly, if the initial attitude is negative, there is a tendency to perceive and interpret selectively in an unfavorable direction. And if the stranger group (or some other group in the new environment) does not succeed in becoming a reference group of importance for the stranger, his attitudes may remain "frozen" in previous reference groups.

It would then follow that when one of these factors adds its impact to one already exerting influence, it increases the resultant driving force and at the same time decreases the resultant restraining force.

In accordance with this hypothesis it was found that the change among those students on whom two or three of the above factors operated in a favorable direction was far higher than could be explained by merely adding up the changes produced by each of the factors when operating alone.

### 3. *The Maintenance of Change*

So far the discussion has centered on the production of change. The question now arises whether the change produced by the cross-cultural experience will be merely what has been called "a shot in the arm" or whether it is a permanent change. It may be suggested that the maintenance

of the change will depend both on the conditions faced by the student upon return to his home-environment and upon the conditions under which the change originally took place. In particular we would stress the factors which proved to be of such importance in the original occurrence of the change—group reference and salience.

Our study shows that the persistence in the home environment of newly-acquired attitudes running counter to the prevailing home norms will depend largely upon the measure of social support such attitudes are accorded. Although the students dispersed when they arrived home, the "stranger" group did not completely disintegrate. Many of the students maintained relatively close contact. Support from this—and sometimes from other reference groups, such as their youth organizations—did much to preserve the newly-acquired attitudes, whereas those deprived of such support began to falter.

As far as the conditions under which the change originally occurred are concerned, Kelley (9) has raised the problem of the persistence of changes produced under conditions of high and low salience respectively of the counter-norm. While the students were in Israel it was clearly easier to produce a change in their attitudes running counter to the norms of their American groups when the salience of these groups was low. But the question was whether such change would persist on their return home under conditions of high salience of the American groups. The material of our study supports the contention that it may be more effective to draw attention to the American norm during the influence process so that when the students return they are already equipped to cope with the criticism which their deviation arouses.<sup>13</sup>

#### 4. *Principles of Reeducation*

We may now summarize some of the factors which facilitate or retard reeducation in the cross-cultural situation.

- (a) To the extent the student refers to a new group with norms different to those of his previous reference groups, the probability of change will be higher. In our study the stranger group served as such medium of change.
- (b) To the extent that the hosts are perceived as "insiders," as "one of us," they are more likely to succeed as agents of change. The boundaries

<sup>13</sup> Cf. the statement by Watson and Lippitt: "If the original change situation has included full awareness of the home context, the problem of maintenance is minimized. The home situation is then not very different from the influence situation: the battles against home prejudice have already been fought and won" (21, at p. 147).



of the "in-group" are redrawn in accordance with the particular problem: sometimes the Israelis as Jews were seen as "insiders," sometimes—for example in regard to American immigration to Israel—they were not.

(c) Influence attempts by the hosts are likely to fail when they are perceived by the students as an exertion of pressure, i.e., an attempt to limit their freedom of choice. The students also did not change when subjected to criticism, when under attack.

(d) Reeducation is facilitated when the students are given opportunities to discover the facts on their own. Thus considerable change took place when the students participated in the life of immigrant settlements as teachers and youth counsellors.

These findings on change in the cross-cultural situation link up with findings in other spheres of reeducation (8), and point up the desirability of treating all these particular instances within the broad context of reeducation.

#### H. SUMMARY

Data derived from a panel study of American Jewish students in Israel were analyzed within several conceptual contexts.

The problems of learning and adjustment of the student in a foreign country were looked at as those of a person in a new psychological situation, as those of a stranger in the host society, and as those of a person in overlapping situations. Attention was given to the effect of the orientation of the student on the cross-cultural experience. Change in the cross-cultural situation was viewed as a particular instance of reeducation.

At the same time attention was directed to the special perspective provided by the study of cross-cultural education on these processes.

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## DISTANCE AND CONFORMITY IN CONTINUOUS SOCIAL INFLUENCE INTERACTIONS\*

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### A. PROBLEM

In the study of human behavior, and more specifically in the study of social interactions, there has been extensive interest in the problem of modifying an individual's judgments. In the realms of belief and opinion, many of the propaganda techniques devised during the past 50 years serve as excellent illustrations. Psychotherapy, too, may be considered within the context of social influence (3). In accord with present interest in behavior control, investigators have been concerned with isolating those variables which determine an individual's judgments (2).

A number of recent studies (1, 4, 5, 6) have demonstrated that "distance" is a significant determinant of social influence. Distance is defined as the discrepancy between the subject's (*S*'s) pre-influence judgment and the subsequent judgment originating from an influence source. In one experiment by Fisher and Lubin (5), the relationship between distance and measures of influence was investigated parametrically in a serial (continuous) interaction situation. A brief summary of their method and results is desirable since the present experiment is an extension of their work.

Pairs of *S*s were placed in a social influence situation requiring judgments of the number of paratroopers seen in briefly exposed photographs. Two pictures were used successively after a preliminary warm-up period. On the first interaction, Photo *A* (with approximately 165 men), distance was varied systematically on independent groups of *S*s from zero to the absurd figure of 5100. This was controlled by intercepting each *S*'s initial written judgment to Photo *A*, and replacing it with a bogus estimate at a pre-determined distance before passing it to his partner. Thus, for example, each *S* in the 40 distance group was led to believe that his partner's estimate was 40 greater than his own initial judgment; and so on for the other groups. The bogus message was always higher than *S*'s initial judgment except, of course, in a zero distance group. After each *S* made a number of

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<sup>1</sup> The assistance of Dale Gibson in the data collection is gratefully acknowledged.



subsequent judgments to the same stimulus, the second interaction was initiated by presenting Photo *B* (approximately 300 paratroopers). Each *S* then made his initial judgment to this photo, following which all *Ss*, regardless of the distance received on Photo *A*, were now exposed to a distance of 320. As in Photo *A*, the bogus estimate was always higher than *S*'s initial judgment.

The main results were as follows:

(a) For Photo *A*, movement (the amount of change from initial judgment) increases with distance up to a certain point, as shown in Fig. 1a; the data then suggest that the curve begins to decrease at extremely

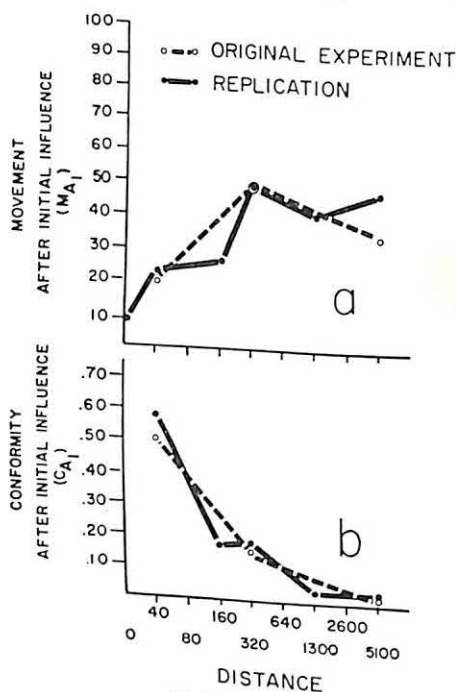


FIGURE 1  
MEDIAN INFLUENCE MEASURES ON CARD *A* AS A FUNCTION OF DISTANCE  
[FROM FISHER AND LUBIN (5)]

large distances. Figure 1b, however, reveals that conformity (movement divided by distance) is a decreasing monotonic function of distance: the larger the distance to which *S* is exposed the less he conforms.

(b) A second finding was that influence can be indirectly manifested between interactions on successive stimuli. Those *Ss* exposed to large distances on Photo *A* gave significantly larger initial judgments to Photo

*B*—prior to any direct influence attempts on this second stimulus. This “intertrial effect,” as seen in Figure 2, is strongly contingent upon the distance *S* previously received. Note that *Ss* in the 5100 distance group on Photo *A* gave a median initial judgment of approximately 900 to Photo *B*, whereas *Ss* in the zero and 40 distance groups gave essentially accurate judgments of 300.

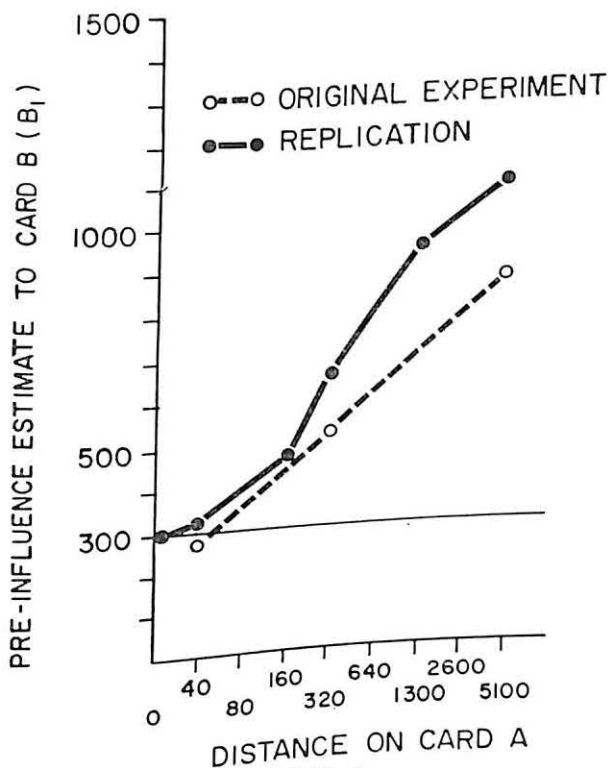


FIGURE 2  
MEDIAN INITIAL ESTIMATE ( $B_1$ ) ON CARD *B* ("INTERTRIAL EFFECT")  
[FROM FISHER AND LUBIN (5)]

(c) An additional result relevant to the present problem pertained to the amount of conformity shown on Photo *B*. It was found that after an influence attempt in which all *Ss* were exposed to the same distance (320) on Photo *B*, conformity was apparently independent of the distance received on Photo *A* (Figure 3). Although the 5100 distance group had demonstrated considerable intertrial effect in their initial judgments to Photo *B*, this group appeared to be influenced neither more nor less than any other group.

The primary question for the present study concerns the second stimulus. If, instead of holding distance constant for all *Ss* on Photo *B*, what would happen if distance is experimentally varied? Would the same relationships between distance and influence measures be obtained on the second stimulus as was found on the initial interaction? Or might it be that these relationships cannot be generalized beyond the initial interaction in a continuous series, particularly after some intertrial effects have occurred?

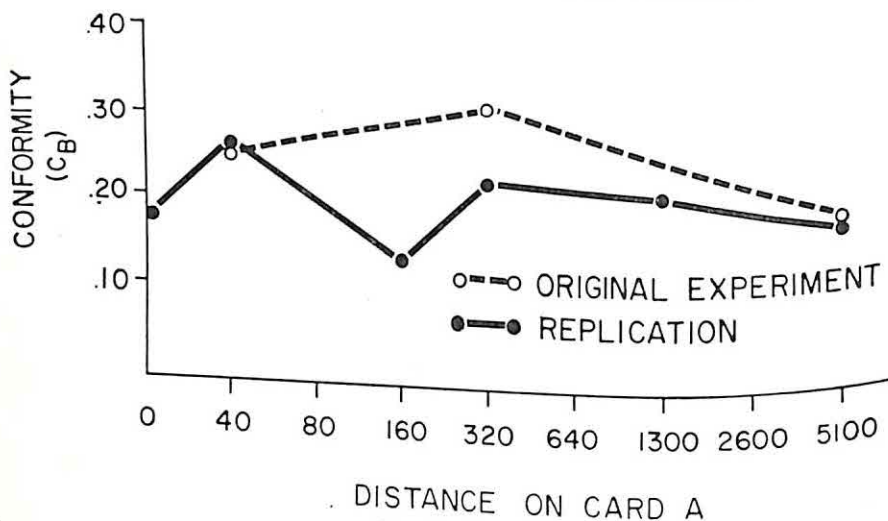


FIGURE 3  
MEDIAN INTRATRIAL CONFORMITY ( $C_1$ ) ON CARD *B* AS A FUNCTION OF DISTANCE ON CARD *A* [FROM FISHER AND LUBIN (5)]

#### B. METHOD

To investigate this problem, the Fisher-Lubin study was repeated essentially up to the point where an influence attempt was made on Photo *B*, the second interaction.<sup>2</sup> Here instead of adding a constant distance of 320 as they did, each *S* received a standard bogus message of 1000. Thus, the actual distance *S* received on Photo *B* was made dependent upon his initial judgment to the photo: if this was 300, then the distance was 700; if his initial judgment was 900, the distance was only 100. Ninety-six volunteers from elementary psychology courses were randomly assigned to the 40, 160, and 320 distance groups for the Photo *A* situation.<sup>3</sup> Then to the extent that each of the three groups showed an intertrial effect (i.e.,

<sup>2</sup> For a more complete description of the experimental procedure, refer to Fisher and Lubin (5).

<sup>3</sup> Each group of 32 *Ss* contained an equal number of males and females. No consistent sex differences were revealed; hence, the samples have been pooled.



differed in initial judgments to Photo *B*), each was exposed to a different distance on Photo *B*.

In Figure 4 the results of the attempt to manipulate the intertrial effect are shown. After being exposed to different distances on Photo *A*, the groups differ significantly in their initial judgment to Photo *B*. Apparently sampling fluctuations produced a curve in which the 320 group does not show a greater intertrial effect than the 160 group (contrary to expectation),

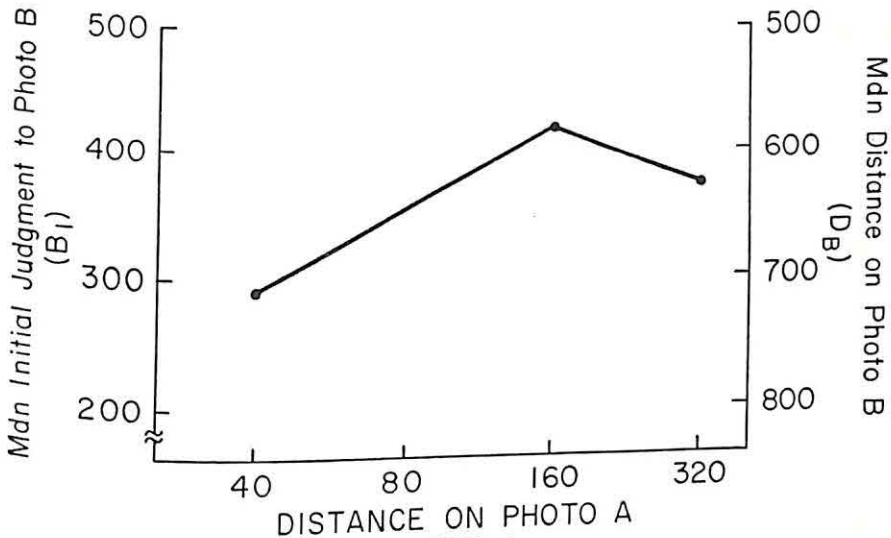


FIGURE 4  
INTERTRIAL EFFECT ON PHOTO *B* (SEE TEXT)

but the figure does indicate that for the present three samples, three different medians emerge. The righthand ordinate of Figure 4 shows the subsequent median distance that each group received when the standard bogus message of 1000 was used: the 40 distance group on Photo *A* had a median  $B_1$  of 290, and was thus exposed to a median distance of 710 on Photo *B*; the 160 group, with a median  $B_1$  of 425, received a median distance of 575; the 320 group, with a median  $B_1$  of 375, subsequently was exposed to a distance of 625.

When movement and conformity on Photo *B* are graphed as a function of distance, Figure 5 shows that the conformity curve is essentially similar to the function obtained on Photo *A*: a decreasing monotonic relationship (median test significant beyond the .01 level).<sup>4</sup> The curve of movement

<sup>4</sup> Using all *Ss* ( $n = 91$  where data on both variables were available), a rank order correlation of  $-.52$  was obtained. A correlation ratio, taking into account the apparent curvilinearity, should yield an even stronger relation.

is seen to follow the conformity curve, although the relationship is not statistically significant. The meaning of this movement function becomes clearer if one reexamines Figure 1a, where one notes that the movement curve on Photo *A* seems to reach a plateau and subsequently decrease when the distance exceeds 500 or so.

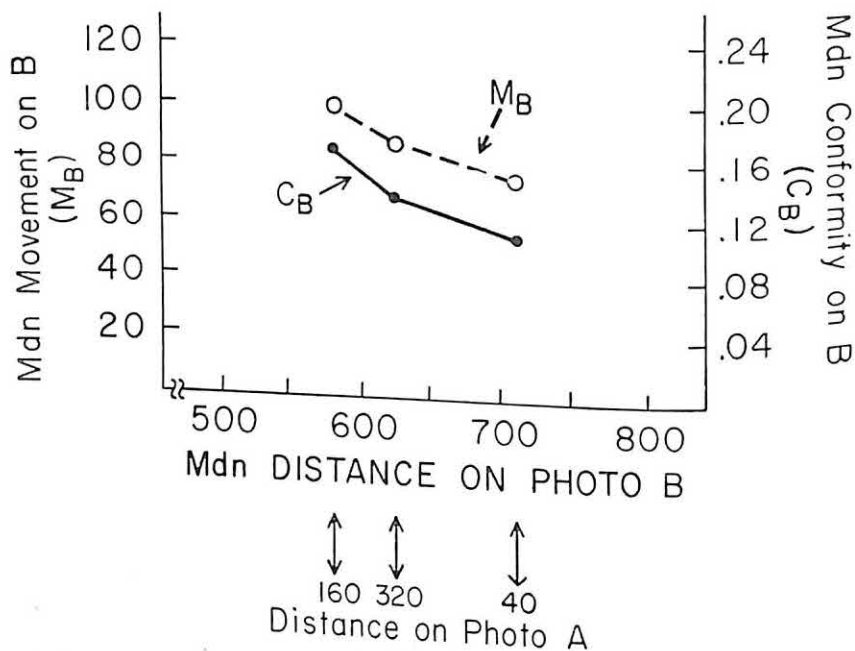


FIGURE 5  
MEDIAN INFLUENCE MEASURES ON PHOTO B AS A FUNCTION OF DISTANCE

### C. DISCUSSION

Our results indicate that on each of two successive stimuli in the interaction situation, the degree of social influence is a function of the distance involved in the interaction. It appears that this function is a stable one, independent of the particular position of the stimulus within the interaction series—and by implication, independent of any preceding intertrial change. That is, there is no evidence to support the hypothesis that because an S's initial judgment may have been affected by a previous influence-interaction that he will now respond differently to a given distance. Rather, the data seem to support the conclusion that the distance on a particular interaction is the primary determinant of conformity on that interaction. An obvious practical implication of this finding is that the effects of a given

distance can be predicted on one interaction even when the history of previous interactions is unknown; as noted elsewhere (4), the overall amount of influence will be indeterminate when the degree of intertrial effect cannot be estimated, but this will merely affect S's initial judgment. Once this judgment is made on any interaction, his subsequent conformity behavior is unrelated to previous distance-experiences.

#### D. SUMMARY AND CONCLUSIONS

This experiment was a continuation of research aimed at specifying the relations between measures of social influence (movement and conformity) and distance (size of discrepancy) in continuous social interaction situations. Pairs of Ss were required to judge the number of paratroopers seen in two successively exposed photographs. By manipulating the amount of intertrial influence (4, 5) between the two photos, it was possible to vary experimentally the distance each of three groups received on the second photo. The results indicate that movement and conformity in a second interaction are contingent upon distance as in the initial interaction. Within the distance range covered, in both interactions conformity was found to be a decreasing monotonic function of distance.

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## SOME DISPOSITIONAL CORRELATES OF CONFORMITY BEHAVIOR\*<sup>1</sup>

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### A. PROBLEM

A number of recent publications (1, 2, 5, 6, 13) have reported investigations of the role of individual differences in susceptibility to social influence. Related investigations (11, 12) have been concerned with the personality correlates of suggestibility and persuasibility. In general there is agreement as to the existence of one or more general personality factors in resistance or susceptibility to persuasive communications and social influence. Other investigators (3, 9, 10), on the other hand, have suggested that several variables determine conforming behavior rather than a "single trait of suggestibility." However, the importance of more general traits in resistance to influence is not discounted in that statement.

In view of this evidence the present study was designed to investigate further the presence of consistent dispositional characteristics which contribute to individual differences in susceptibility to social influence. The present study differs from the various earlier investigations in the use of a wider variety of tasks imposing different behavioral requirements on individuals, a novel method of measuring conformity, different populations, or additional variables. These procedures should contribute to broader generalization of the results of earlier investigations.

The present report deals primarily with the sources of consistent individual differences,—motivational, sex, age, and intellectual differences, which predispose the individual to susceptibility by social influence. In some instances prior studies have been replicated, but in most instances new measures of the several variables have been introduced.

### B. METHOD

#### 1. *Apparatus*

The apparatus used was a modification of one described in earlier publications by Crutchfield (5, 6) and by Deutsch and Gerard (7). The

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reader is referred to those publications for details. In summary, five *Ss* were seated in separate booths facing a panel of lights. The panel was composed of three parts: (a) a column of red lights (labeled *A*, *B*, *C*, *D*, and *E*) at the extreme left to signal the *S*'s position for a specific problem; (b) five rows of four green lights (labeled 1, 2, 3, and 4), each row corresponding to one of the booths; and, (c) a row of four switches at the bottom of the panel.

Each *S* was led to believe that for each judgment he was in one position, for example, *D*, while each of the other *Ss* was in one of the other four positions, for example *A*, *B*, *C*, and *E*. Using this example, when the red light, *D*, appeared on the *S*'s panel, he was to wait until a green light appeared in Rows *A*, *B*, and *C*, indicating the choice made by *Ss* in the respective booths. Subject *D* then responded by lifting one of the four switches (1, 2, 3, or 4) which corresponded to the alternative he judged as correct. When Subject *D* lifted his switch, presumably the appropriate bulb lit on each of the other *S*'s panels. A light for Subject *E* then appeared on his panel. In actuality the switches were connected only to the experimenter's panel and the lights on the *Ss*' panels were controlled exclusively from the experimenter's panel.

## 2. *The Conformity Measure*

The scale used for measuring conformity consisted of 86 items mounted on individual slides. On each of the problems all *Ss* were in exactly the same position, although the position was changed from one problem to the next in the series. The scale was divided into two parallel forms referred to as Form *A* and Form *B*. The forms were made equivalent on the basis of placement of the item in the series, total length, number of conformity items, and type of item. The reliability of the measure, as determined by the correlation between the two forms, was .80 corrected by the Spearman-Brown formula.

There were 36 critical items requiring attitudinal, informational, and perceptual judgments. The conformity score was based on these critical items in which the *S* was in the last position when making his response and in which the background reports deviated from the veridical or modal response.

The remaining 50 items were filler items and bogus items distributed randomly among the critical items, and were used to prevent discovery of the deception involved in the use of the apparatus. For the filler items, the *S* might be in any of the five positions (including the fifth position)

when responding and the background reports for these items were always consistent with the veridical response. For the bogus items, the *S* would be in any of the first four positions and the background reports always departed from the veridical by a majority of two or more. The background reports were controlled by the *E* so that they were identical for each *S* on each task.

### 3. *Personality Measures*

The measures of individual motivations consisted of Stern's *Activities Index* (15); *Edwards Personal Preference Schedule* (8); *Ideology of Conformity* (14); and Taylor's *Manifest Anxiety Scale* (16): A modification of Gough's *Adjective Check-list* (2), a self-rating scale, was constructed using only those items found by Barron to differentiate between independent and yielding *Ss* in Asch's group interaction procedure for measuring conformity. The measures of intellectual ability included the *Cooperative Reading Test* (18), the *ACE Psychological Examination* (19), and the quality point ratio of the student's academic work. In addition, the relationship of sex, age, and fraternity affiliation to conformity was investigated.

All measures were administered to the *Ss* prior to their participation in the experiment.

### 4. *Procedure*

The data presented here stem from several separate studies which were conducted with other specific interests. However, all of the groups described here were given exactly the same treatments since they comprised the "control" groups of our experiments. In these situations the *S* was informed that he would be required to perform on several tasks requiring perceptual judgments. He was informed that his method of responding would be to lift the switch on his panel and that when he did this he would signal his response to all of the other participants and to the *E*. He was also informed that he would know what the responses of the other *Ss* were by the lights on his panels. In this manner all of the *Ss* were responding under social influence, as defined in this study, but were not administered other experimental treatments. On the basis of post-test questionnaires, less than 10 per cent of the *Ss* were aware of the exact nature of the experiment and none were aware of the deception involved.

### 5. *Subjects*

Inasmuch as scores were obtained on different populations within a series of studies the number of *Ss* in each phase will be reported below. All *Ss*



were students in the first course in psychology at Syracuse University except those used in determining the relationship between age and conformity. The latter group were summer session students in education courses as noted below.

### C. RESULTS

All conformity scores represent the number of errors made by Ss which coincided with the majority report on the critical items. A high score represents a greater degree of yielding and a low score represents a greater degree of independence.

#### 1. Motivational Measures

These include the two self-report devices for measuring needs, the *Activities Index* and *Edwards Personal Preference Schedule*.

One-hundred and twenty Ss were used in the analysis in which scores from the *Activities Index* were correlated with conformity. None of the scores of the 38 independent need categories on this scale was significantly related to yielding. Among the composite scores from this index the cor-

TABLE 1  
CORRELATIONS BETWEEN CONFORMITY AND THE COMPOSITE CATEGORIES OF THE  
*Activities Index*  
(N = 120)

Trait	Pearson $r^*$
Submissive-restrained	.23
Outgoing-sociable	— .21
Cautious-controlled	.22
Theoretical-intellectual	.24

\* All correlation coefficients reported in this table are significant at the  $< .05$  level of confidence.

relations presented in Table 1 were significantly ( $p < .05$ ) greater than zero. These data suggest that the composite scores from the *Activities Index* are more reliable than the independent scores, as reflected in the significant correlations with conformity.

The *Edwards Personal Preference Schedule* was used with 32 Ss. Pearson product-moment correlations were computed to determine the relationship between each of the 15 needs on this scale and yielding. Only the achievement need score was significantly related ( $r = -.48$ ) to conformity. However, since this is the only significant coefficient of the 15 examined, and since the achievement score from the *Activities Index* was not highly correlated with conformity ( $r = -.27$ ) one might suspect the correlation of  $-.48$  occurred by chance.

## 2. Self-Ratings

The modified Gough *Adjective Check-List*, as described above, was administered to 120 Ss. For the analysis of this data, the Ss were divided into two groups on the basis of their conformity scores: the top 37 per cent representing the yielders and the bottom 37 per cent representing the independents. By standard item analysis procedures the number of times an adjective was checked by the yielding group was compared with the number of times it was checked by the independents. The significance of the difference was determined by use of the table of minimum contrasts required in fourfold contingency tables for significance at the .01 and .05 levels of confidence.

The self-ratings describing common traits, significantly differentiating between the two groups, are presented in Table 2. Four of the traits in

TABLE 2  
DESCRIPTION OF COMMON TRAITS OF YIELDING AND INDEPENDENT BASED ON SELF-RATINGS

Independents (N = 45)*	Yielders (N = 45)*
Moody	Modest
Optimistic	Tactful
Logical	Excitable
Rational	Kind
Demanding	Mannerly
Humorous	Emotional
Original	Obliging
	Helpful
	Patient

\* Discrimination significant at  $< .05$  level of confidence.

the table are reversed from those described by Barron: optimism and humorous were more frequently checked by yielders whereas excitable and emotional characterized the independents in Barron's study. Fourteen adjectives were found not to discriminate between the two groups in the present study.

## 3. Ideology of Conformity

This measure is a self-report of the individual's beliefs about conforming behavior. A typical item is as follows: "When in a group one should try to be agreeable and do what the others want rather than cause confusion by making suggestions one's self." The scale was used with two groups of Ss, one composed of 50 Ss and the second of 120 Ss. The obtained correlations with conformity were .51 for the first group and .34 for the

second group. Both correlation coefficients are significantly greater than zero at the .01 level of confidence. These findings corroborate those of Nadler (14) using a different experimental procedure.

#### 4. *Manifest Anxiety*

The *Manifest Anxiety Scale* was administered in conjunction with the foregoing *Ideology of Conformity Scale* to 120 Ss. The correlation between the anxiety scores and conformity was .17 which is significant between the .10 and .05 levels of confidence. The null hypothesis was not rejected.

#### 5. *Intellectual Ability*

Significant relationships were found between conformity and each of three measures of intellectual ability in a population of 120 Ss. Conformity scores correlated  $-.24$  ( $p < .05$ ) with the *Cooperative Reading Test-Vocabulary* scores;  $-.20$  ( $p < .05$ ) with *ACE Psychological Examination-Language* scores; and  $-.30$  ( $p = .01$ ) with the *quality point ratio* of academic achievement.

#### 6. *Age*

On the basis of the findings in a previous investigation (6) it was hypothesized that yielding is inversely correlated with age. A group of 70 summer session students with an age range of 18 to 40 years was used in the experimental situation to test this hypothesis. A Pearson product moment correlation was computed between age and yielding errors. The obtained correlation was  $-.24$ . A test of the null hypothesis, that this correlation was not significantly different from zero, *via* the *t* test yielded a *t* of 1.92. This figure is significant ( $p < .05 > .01$ ) using the one-tailed distribution of *t*, and supports the hypothesis that older individuals are less susceptible to social influence than are the younger individuals.

#### 7. *Sex*

In the data obtained from initial pilot studies the observation was made that female Ss were more susceptible to social influence than were male Ss. A bi-serial correlation computed on these data was .27, the females having the higher conformity scores, and the males the lower scores.

The hypothesis was, accordingly, modified to predict higher conformity scores for females than for males. This hypothesis was tested on two populations, the data for which are presented in Table 3 below.

The first population was equally divided between males and females. The



variance ratio was not significant ( $p > .10$ ). The  $t$  test was used to test the null hypothesis of no difference between the two means. The obtained  $t$  of 2.2 indicated that the mean difference of 2.9 was significant ( $p < .05 > .01$ ) using the two-tailed distribution of  $t$ .

TABLE 3  
YIELDING ERRORS OF TWO POPULATIONS OF MALES AND FEMALES

Sex	N	Population 1 Mean	SD	N	Population 2 Mean	SD
Males	35	10.4	5.8	42	11.0	6.3
Females	35	13.3	6.3	135	13.5	7.4

The  $t$  test was not useable for the data obtained with the second experimental population because the variance ratio was significant, indicating heterogeneity of variance. The Mann-Whitney  $U$  test was used for that analysis since it avoids the assumptions of the parametric  $t$  test. The obtained  $z$  of 1.92 for the data was significant at the .03 level of confidence, which permitted rejection of the null hypothesis.

#### 8. Group Affiliation

An analysis was made of the scores of 39 Ss who belonged to either fraternities or sororities and 28 Ss who were independents. The mean score of the latter group was 2.4 points higher than that of the former. The  $t$  obtained in a test of the significance of this difference was 1.34 ( $p > .05$ ) and did not permit rejection of the null hypothesis.

#### D. DISCUSSION

The evidence in the present study clearly indicates the presence of consistent dispositional characteristics which contribute to individual differences in susceptibility to social influence. Outstanding in these findings is that high and low conformers may be distinguished on the basis of intellectual ability, self-confidence, motivations, and orientations to interpersonal relations. Although no cause and effect relationships can be established on the basis of correlations it may be hypothesized that, for the large part, these factors reflect the culmination of personal experience and the modification of that experience by cultural demands. These experiences in turn, lead to greater or lesser degrees of susceptibility to persuasion by others.

Although many of the correlations reported here account for a relatively small proportion of the common variance, the findings take on importance when compared with those reported in previous publications. In every

instance where prior studies were replicated, with the present experimental procedure, the findings corroborate those described by other investigators in the review presented above. Consistent trends are also to be noted among the measures used on the several populations in the present study. These factors suggest that the generality of the findings is highly plausible, at least for typical college populations.

The independent individual is characterized by out-going and sociable characteristics; other individuals being viewed as equals providing opportunities for mutually satisfying relationships rather than the placement of oneself on a submissive level. An intellectual and cognitive orientation is found in this group's self-rating on the adjective check-list. Their preference for activities leading to achievement may reflect a striving element in their behavior.

The yielding or conforming individual, on the other hand, is characterized by restraint, caution, and submissiveness. The self-ratings indicate an emotional orientation involving consideration for others. When both findings are viewed simultaneously, a possible interpretation appears to be that the yielder places himself in a condescending position to others.

The negative correlations between conformity and intellectual ability have been noted in other studies (5, 6). The present interpretation is not that intelligence *per se* is a decisive influence in resisting the pressure of social influence. Rather, it appears, in view of other findings in this laboratory, that the intelligent individual achieves a greater clarification of the tasks presented him. Accordingly, there is less ambiguity (which is clearly a factor in conformity), for the tasks are structured and clear cut. The intelligent individual depends upon his own judgments rather than those of others not because "he knows better" but because the tasks and solutions attain clarity. For the individual of lesser intelligence the tasks do not achieve the same degree of cognitive clarity, the answers are not immediately apparent and consequently a degree of ambiguity is introduced. Being uncertain, more confidence is placed in the majority judgment than on his own perceptions as a source of information.

The difference in the conformity behavior of the sexes undoubtedly reflects the cultural experiences of the two groups. A relevant example is Child *et al.* (4) characterization of the differential treatment accorded the sexes in textbook presentations. They indicate that the males are more often described as aggressive, intelligent, constructive, striving, and prestigious. The females, on the other hand, are described as sociable, kind, and timid but inactive, unambitious, and uncreative. Through identification with these

figures in early training in the sex role, it is quite plausible to expect the possibility of a pattern of behavior emerging, which for females will parallel the description of the conforming person, and for males will parallel that of the independent. Whether or not these differences would continue through the adult years remains to be answered. The present data indicate a decline of susceptibility to social influences with age. One might hypothesize that this is a function of the increase in the self-confidence of the individual as he achieves a relatively greater degree of independence than is present in individuals of college age. However, interpretation of both sex and age differences in conformity will require further research.

The positive correlation between the scores from the *Ideology of Conformity* scale and the scores in the laboratory situation indicates a general dispositional tendency which mediates low or high resistance to social influence. For some individuals at least, conformity appears to be high on the habit hierarchy, whereas for others it is somewhat lower.

#### E. SUMMARY

The Crutchfield technique was used for measuring conformity in a laboratory setting. The relationships of several personality variables, including needs, self-ratings, ideology, sex, age, and intellectual ability with conformity were reported. The data indicate the presence of consistent sources and dispositional characteristics which contribute to individual differences in susceptibility to social influence.

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## PERSONAL PREFERENCES AND CONFORMITY\*

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### A. PROBLEM

Conformity pressures have been shown to act in systematic ways in shifting judgments of a variety of materials, including logical analysis (6), political attitudes (11), perceptual tasks (10), and so on. For the most part, all of these share in common a development through a complex process of social validation. Stimulus materials which evoke a personal preference have been reported to be resistant to the effects of conformity pressures, presumably because they do not seem to derive their personal meaning or validity from a social frame of reference (4). A preference which does not have some anchorage in social experience, however, is difficult to identify.

One approach to the problem is to find a preference which appears, on a "common sense" basis, to be privately derived to as large an extent as possible and then to test this preference by subjecting it to conformity pressures. In this way, the susceptibility to these pressures of certain specific preferences may be revealed, as well as the disclosure of clues to the formation of the preference and its social and private components.

The present study is designed to test judgments of beauty, a kind of judgment that would seem to be influenced extensively by personal considerations. This type of judgment obviously would be affected by social factors but would also seem to be strongly influenced by inner factors. If judgments of beauty are shown to be subject to change as a result of social pressure, we may tentatively conclude that this personal component has been overridden by the social one. This would then justify the removal of the particular preference from a "personal" category and lend emphasis to the question of the existence of a choice or preference which is predominantly private in nature.

### B. METHOD

#### 1. *Development of the Stimulus*

A stimulus which represents beauty was found to present unanticipated problems in attaining reliable evaluations. Such factors as cosmetics, hair style, facial expressions, and coloring, rather than individual differences in

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attitudes toward beauty *per se*, were found in initial studies to account for the greater part of the variability. Judgments of landscapes were found to be based on similarity to home, rather than on beauty. Judgments of architecture were found to be based on function or utility.



FIGURE 1  
AN EXAMPLE OF A STIMULUS CARD STANDARDIZED AT A VALUE OF 3-RATHER UNATTRACTIVE

A more reliable stimulus was found in a profile drawing of the female head, with hair styling held constant, with color eliminated, and with slight variations in the lines and planes of the face, the hairline, the shape of the nose and chin, and so on. Figures 1, 2, and 3 are examples. Gradations of beauty were drawn up so as to range in seven step intervals from homely to beautiful. Seven and one-half by 10-inch stimulus cards were used. These



cards were exhibited in a frame, one at a time, with no limit on the time available for the Ss to make their ratings.

There were 80 students at the University of Texas in the standardization group; all were undergraduates, both males and females. In order to estimate



FIGURE 2

AN EXAMPLE OF A STIMULUS CARD STANDARDIZED AT A VALUE OF 4-AVERAGE

the reliability of the cards, they were presented a second time to half of the standardization group, in shuffled order. Analysis resulted in an uncorrected reliability coefficient of .91.

## 2. *Induction of Conformity Pressures*

Simulation of the social background has been found to be as effective as if those composing it were physically present (2, 7). The social background was simulated by use of a rating form which, as it appeared to the S, had

been used previously by other Ss. The number of "previous raters" varied with the conditions of the experiment, and the handwriting was varied to make it appear more realistic. Variations in ink colors and pencil lead shades were also used in this respect. Judgments were entered by the Ss on the



FIGURE 3  
AN EXAMPLE OF A STIMULUS CARD STANDARDIZED AT A VALUE OF 5-RATHER ATTRACTIVE

rating form in the column immediately adjacent to those used by the "previous raters."

At the top of the rating form was a rating scale giving seven categories of beauty which were numbered and labelled in the following manner: 1—homely, 2—unattractive, 3—rather unattractive, 4—average, 5—rather attractive, 6—attractive, and 7—beautiful. Ss were told that in this experiment an attempt was being made to learn something about how people per-

ceive beauty. They were asked to inhibit any overt emotional responses and not to consult with other students on the ratings. Ratings were made by looking at the picture, placing it on the rating scale, and then placing the appropriate number opposite the number of the picture on the rating form in the first blank column to the right of those used by "previous raters."

Pilot studies were conducted with individuals and groups ranging in size from two to seven. Apparently, in no case did Ss suspect the real nature of the study. There was no interaction detected when groups were used and the experiment was continued using complete classes in the University.

### 3. *Experimental Conditions that Were Held Constant*

In all experimental conditions influence was exerted by changing the standardized values of the stimulus pictures by two full categories on the rating scale: that is to say, if the standardized value of the picture were 4, and the influence was being exerted in an upward direction, the experimental value appearing on the rating form would be 6. If the influence was being exerted in a downward direction in this case, the experimental value appearing on the rating form would be 2. When the background consisted of three "previous raters" this experimental value was the desired value. When the background consisted of five "previous raters" the same numbers were used as when it consisted of three, except that the lowest and highest numbers were used twice. The order of the numbers in both cases was varied at random.

Fifteen experimental cards were used, five in each of Categories 3, 4, and 5. These were placed in a random order which remained unchanged. An additional "fill-in" card was placed between the fifth and sixth cards and between the tenth and eleventh cards so that the averaging of the background numbers could be varied to prevent the giving of clues on the nature of the experiment. Six representative cards were presented to the Ss prior to the above 17, but were not rated on the rating form, in order to acquaint them with the stimuli. The other 17 cards were rated on the rating form.

### 4. *Variations in the Experimental Conditions*

Table 1 is a summary of the various experimental conditions. In the first part of the study a social background of three "previous raters" was used. There were eight groups of 20 Ss each, four groups being influenced



in a downward direction and four groups being influenced in an upward direction. Each set of groups represented all combinations of the sex of the S and the sex of the background: Male Ss with male backgrounds, male Ss with female backgrounds, female Ss with female backgrounds, and female Ss with male backgrounds. Each rating form indicated the sex of the "previous raters" who comprised the social background.

TABLE 1  
A SUMMARY OF THE VARIOUS EXPERIMENTAL CONDITIONS, EACH BEING COMPARED WITH THE STANDARDIZATION GROUP BY THE USE OF A SIMPLE *t*-TEST, TWO-TAILED (IN EACH GROUP  $N = 20$ .)

Sex of S	Sex of background	Number in background	Direction of influence	Level of confidence
M	F	3	Upward	.05
M	M	3	Upward	.0005
F	F	3	Upward	.0005
F	M	3	Upward	.0005
M	F	3	Downward	.005
F	F	3	Downward	.0005
F	M	3	Downward	.0005
F	Not given	5	Upward	.005
M	Not given	5	Downward	.0005
F	Not given	1	Upward	Not sig.
M	Not given	1	Downward	.001

While examining the resistance of this type of judgment to conformity pressures, an inquiry was also made into the effects of varying the number of people composing the social background. Influence exerted by a social background of 3 in number has been shown to exert a maximum of influence which increases only slightly and insignificantly with an increase in the number in the social background (1).

In the second part of the study the sex of the "previous raters" was eliminated from the rating form and their number was varied. Twenty Ss were exposed to conformity pressures in an upward direction and 20 in a downward direction, using a social background comprised of 5 "previous raters." The same procedure was then repeated using a social background comprised of only one "previous rater," in order to evaluate the effects of reducing the number in the background to 1.

### C. RESULTS

In the first section below the quantitative results are given separately for each variation in the social background. In the second section is a brief description of the qualitative results.

### 1. Quantitative Results

a. *Social background composed of 3 in number.* Each experimental group was compared with the standardization group by use of the simple  $t$ -test. As shown in Table 1, influence was successfully exerted under each condition for each of the eight groups. In all cases the differences were significant beyond the .05 level of significance. Alterations in judgments varied significantly in the direction the influence was exerted. Two-way analysis of variance of sex of background compared with sex of  $S$  resulted in no significant  $F$ s.

When analysis of variance was made with the groups representing each combination of  $S$  and background on one axis and direction of influence on the other, the downward influence was found to produce a significantly greater change in judgments than the upward series ( $F = 9.09$ , significant at the .01 level).

b. *Social background composed of 1 in number.* In the upward influence group the effect was slight in the upward direction, but not significant. In the downward influence group the effect was significant at the .001 level.

c. *Social background composed of 5 in number.* An increase in number composing the background is not accompanied by an increase in the influence exerted. The  $t$  for the downward series was almost identical with those obtained when there were 3 in the background. For the upward series the  $t$  for a background of 5 was greater than that for one of the groups with a background of 3 and less than 3 of the groups with a background of 3 in number.

### 2. Qualitative Results

Introspections, obtained randomly from approximately one in every seven  $S$ s, disclosed that the  $S$  doubted the accuracy of perception and the judgment of the previous raters. He was, however, confused and unsure about his own judgments and usually remarked about the differences between the judgments of the "previous raters" and his own. When  $S$ s asked questions after the experiment, they were related to the nature of beauty and individual differences in evaluating beauty. No  $S$  was found who claimed to make his judgments on the basis of a comparison with an objective standard. In each case, the placing of a picture on the rating scale was considered to be a subjective response.

It was anticipated that there might be a tendency for  $S$ s of dark complexion to judge the pictures higher than  $S$ s of a light complexion, due to the darkness of the hair in the stimulus pictures. It was also realized

that a preference for brunettes on the part of the *S* might produce ratings that were higher than those given by *Ss* preferring blondes. In the early part of the study, analysis revealed that no such relationships existed. Neither the complexion of the *S* nor his stated hair color preference had any relationship with his judgments of the stimuli.

#### D. DISCUSSION

Personal preferences, as represented by judgments of beauty as obtained in this study, are clearly shown to be susceptible to change as a result of conformity pressures exerted by the social background. This seems to eliminate them from an area of special consideration as differing from other preferences in their relation to group norms and standards. Other preferences which have the appearance of not being vital to the group interest and of lying in a more personal category, such as food preferences in children, have also been shown to be highly susceptible to conformity pressures (5, 6).

Instead of considering whether or not a preference is personal, one may conceive of any preference in terms of Helson's Adaptation-Level (6). His concept of "decentering" was first observed in the standardization group. Not a single card received more than a few judgments at the extremes of the scale, although cards intended to be 3 or 5 by the artist were usually standardized at these values. This is not merely central tendency or negative time-order error but a tendency to underrate the higher value cards and to overrate the lower value cards, illustrating the decentering process when the adaptation-level is approximately centered on the scale.

The fact that judgments were influenced to a greater extent in the downward direction may be viewed as another instance of the decentering process under the changed condition of the background. The equilibrium point or A-L is now at a lower point on the continuum than when judgments were made by the standardization *Ss* with a neutral background. Since the cards were evenly distributed along the continuum, social pressures directed toward it result in larger effective influence than pressures in the opposite direction. Why does the A-L shift to a lower point on the continuum as the change in social background is perceived? This could be answered by postulating an increase in defensiveness when making choices in a more public situation and it is not unreasonable to assume that as the background changes it will be accompanied by such concomitant changes in individual residuals.

With a constant stimulus, the A-L for this type of preference may be conceived as a borderline between two zones. One zone is composed of



personal residuals or inner factors. The other is made up of social factors. The size of the social zone is increased as the social background introduces pressures or conformity forces, the personal zone is diminished in size, and the A-L is therefore changed. If the size of these zones is considered as the quantitative components of the choice being made we have an explanation for conformity behavior in terms of A-L theory.

### E. SUMMARY

Personal preferences, as represented by judgments of beauty, were found to be susceptible to conformity pressures exerted by the social background. A social background composed of 3 in number exerted a maximum of influence which was not increased when the number comprising the background was increased to 5. Influence exerted was greater when an attempt was made to lower judgments of beauty than when an attempt was made to raise the judgments. These results are explained in terms of adaptation-level theory.

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## RANKINGS AND SELF-ASSESSMENTS: SOME BEHAVIORAL CHARACTERISTICS REPLICATION STUDIES\*

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### A. INTRODUCTION

One of the major purposes of a recent monograph by Borgatta, Cottrell, and Mann (2)<sup>2</sup> was to replicate findings reported by Carter (3) on the factors necessary to account for most of the observable variance of individuals in interaction. This paper reports further replications designed to test the additions and modifications to Carter's theory stemming from the BCM study. The studies reported attempt to find the same structure of behavioral characteristics that are previously reported and also to examine the more general proposition that people tend to view interaction characteristics with the same frame of reference, whether they rate themselves or others.

Carter reported that in a series of studies, and also in studies reported by others, there appeared to be three factors that recurred in the ratings and other descriptive measures of the interaction characteristics of individuals. He described the factors by the following names: (a) individual prominence and achievement, (b) aiding attainment by the group, and (c) sociability. Two of the factors appeared to replicate clearly in the BCM study. In particular, one that was identified as Individual assertiveness and one called Sociability. Three other factors occurred in such a way as to suggest the possibility that Carter's three-factor theory tended to make an oversimplification through the possibility of mistaking the character of some of the factors. The three factors, besides the two named above, were called Manifest intelligence, Manifest emotionality, and Task interest.

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<sup>1</sup> This study stems from the individual assessment stages of the project, "The Variables and Conditions of Small Group Interaction," at New York University. Jonathan Robbin, technical associate, was in charge of machine analysis, and the research assistants were John Stimson, Robert Guerrin, Gerald Marwell, and Ardyth Schoner. This research was supported in whole or in part by the U. S. Air Force under contract AF49(638)-195 monitored by the A. F. Office of Scientific Research of the Air Research and Development Command.

<sup>2</sup> Identified as the BCM study in this paper.

It appeared that Emotionality could be confused with a negative pole for Sociability, and Task interest and Manifest intelligence could be confused in a comparison of studies in the absence of marker variables or a sufficient array of variables to provide for clear factor definition.

The five groups that were utilized for the BCM study were drawn from a graduate class in interpersonal relations, and the total sample was 47 persons. Well-differentiated interaction patterns existed in the groups when the rankings on which the study was based were made, and the subjects were mature persons particularly qualified to distinguish among the characteristics that they and others might possess. The choice of subjects was guided in large part in terms of creating a situation where, if the basis for observing others involved more than the three factors reported by Carter, these factors would have an opportunity to arise. In addition to attempting to locate the subject condition for accurate rankings to be made, the panel of characteristics to be used was selected on a broad and eclectic basis, making use of a number of existing theoretical schema in the area. Having found five factors instead of three factors, the question now remained as to whether this was a function of the uniqueness of the sample or whether indeed in a quite different kind of a setting the five factors would recur. The first purpose of the replications reported here was to examine this kind of proposition.

## B. THE PRESENT REPLICATIONS

One of the tasks of a large research at New York University, designed to measure the characteristics of groups, required that the characteristics of individuals be ascertained in advance in order that certain kinds of groups might be constituted on the basis of the individual characteristics. The data of this report stem from phases of individual assessment.

The sample for the first study reported is of 175 male sophomores and juniors, paid subjects from the colleges of New York University. The subjects were randomly selected to participate in five-person groups discussing four statements. The subjects were familiar with the statements at least to the extent that they had answered them as part of a General Orientations Profile (GOP), a questionnaire designed to locate respondents on a large number of issues and interests. The four discussion statements were chosen so that in the population of subjects they were orthogonal and, in addition, the statements used had other statements to which they were highly related. The analysis of these statements was done first for the population of male subjects and then replicated with female subjects. Thus, on



a random basis, the situation for discussion was so drawn that the agreements among group members on the content would have an opportunity to shift from topic to topic. Each five-person group met for four successive 20-minute periods, with a mandatory decision to represent the "consensus" at the end of each period. Following the last discussion, the members responded to a set of post-meeting questionnaires including one involving ranking the group members.

The behavioral characteristics form, which included the 40 descriptive phrases and trait names on which the members ranked each other, was based on the experience of the BCM study. An attempt was made to substitute some items for those that were repetitive of Individual assertiveness and Sociability in order to make it possible to get a clearer definition of the three other factors, if indeed they would recur. An effort was made to select the new items so that they could contribute additional independent content, rather than repetitive items. Selection of new items was not an easy task on the grounds that activity rate (as a variable) is related both to Individual assertiveness and Sociability, and since the items of the other factors were also correlated to these two factors, it also is dependently related to Manifest intelligence, Manifest emotionality, and Task interest. Phrased simply, only the noticeable person can be assessed.

The rankings made in the five-person groups were intercorrelated and the matrix is presented below the main diagonal in Table 1. Only 36 variables were used in this analysis for processing convenience. Since the mean ranking on any characteristic is the same for each group, any correlations that arise among the variables must do so on the basis of the shared frame of reference of the rankers, not only within the group, but also from group to group. The intercorrelation matrix was factored by the Complete Centroid Technique and the orthogonal rotated factors<sup>3</sup> are presented in Table 2. Of the extracted factors, only six appeared to warrant inclusion in the rotation matrix.

The findings of this study, where instead of having sophisticated persons ranking each other we have the members of ad hoc groups after only 80 minutes participation, provide a remarkable replication. We have again called Factor I Individual assertiveness (Table A), and it is seen that the description based on the items that are highest loaded on this factor

<sup>3</sup> The rotations reported for this study are Quartimax solutions that have been subsequently plotted and adjusted to move two factor representations into a single quadrant. Adjustments made were two or less per matrix, representing adjustments of less than 10 degrees, and always involved a large factor.

TABLE 1  
INTERCORRELATION MATRIX

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	—	16	72	47	-45	67	48	69	34	19	75	38	59	46	-40	-38	06
2	02	—	48	25	-25	34	05	43	-04	39	-07	20	01	50	-11	-48	58
3	51	49	—	45	-46	74	31	85	07	38	54	30	38	61	-33	-55	50
4	55	25	64	—	-27	71	40	61	59	-09	13	85	72	66	-34	-24	04
5	-18	-01	-25	-38	—	-56	-28	-43	-06	-05	-36	-14	-28	-36	58	32	-12
6	60	41	71	67	-40	—	45	78	38	19	48	56	59	70	-39	-46	22
7	12	-10	06	15	05	06	—	32	37	03	40	43	68	34	-08	-06	-08
8	57	45	85	69	-35	78	05	—	27	30	51	52	53	75	-25	-44	27
9	37	-13	08	39	-26	36	10	20	—	-29	17	69	64	46	-08	13	-27
10	-17	46	33	03	24	03	03	23	-30	—	29	-09	-14	24	26	-33	42
11	65	12	45	34	-32	44	11	43	16	-01	—	16	43	22	-17	-35	-06
12	54	20	57	83	-37	68	18	64	49	-08	29	—	72	66	-09	-07	-03
13	68	01	43	53	-43	53	13	51	38	-18	46	61	—	47	-26	-13	-10
14	37	60	78	55	-13	61	00	78	09	38	33	51	31	—	-13	-24	23
15	-43	08	-12	-33	69	-36	-04	-19	-23	42	-23	-39	-38	01	—	20	04
16	-09	-44	-51	-38	00	-26	01	-41	27	-48	-26	-22	-03	-52	-09	—	-63
17	01	66	51	20	10	29	-04	44	-19	54	15	09	-07	55	22	-49	—
18	45	-10	13	39	-31	27	13	28	50	-20	21	44	51	11	-21	07	-22
19	37	59	74	69	-25	69	15	76	22	26	35	62	39	71	-16	-46	51
20	-08	63	43	17	14	26	-03	37	-19	53	00	07	-13	55	26	-45	65
21	58	45	81	68	-34	76	08	85	29	19	48	64	54	70	-22	-39	41
22	56	43	77	77	-38	77	11	79	31	16	45	78	50	70	-28	-45	38
23	20	38	55	25	15	28	14	50	-12	55	28	11	07	54	28	-41	57
24	42	52	82	60	-23	67	-02	79	18	33	37	53	36	79	-09	-41	57
25	75	-04	35	54	-11	45	20	41	37	-28	56	52	69	25	-12	-05	-09
26	54	18	49	61	-12	65	16	60	59	-10	32	70	53	49	-12	-05	06
27	50	35	60	60	-23	61	06	69	26	22	40	57	48	56	-17	-36	39
28	39	53	80	64	-20	68	06	82	12	36	37	55	37	72	-03	-50	56
29	61	11	50	71	-44	64	11	64	43	-20	39	75	68	44	-49	-17	02
30	45	51	83	63	-28	71	05	83	12	29	37	57	43	79	-18	-45	53
31	-09	43	24	-07	19	02	-06	20	-33	48	08	-17	-14	25	30	-32	52
32	47	53	90	63	-30	73	-01	88	10	36	41	56	41	78	-13	-48	55
33	50	16	43	55	-24	66	14	58	53	-05	41	62	50	48	-28	-08	11
34	25	59	70	33	-14	48	-03	66	-21	49	32	25	15	67	04	-52	71
35	38	-45	-08	08	-16	08	10	00	28	-36	24	20	46	-19	-17	31	-45
36	41	21	42	23	-18	39	05	41	03	16	37	21	32	38	-10	-20	17

Note Female data above the main diagonal, male data below. Decimal point omitted.

are unmistakable in suggesting this description. What is somewhat different between this study and the BCM study is the fact that assertiveness is more directly identified with items that are descriptive of activity rate. This would be in keeping with the ordinary expectation of what would happen when individuals have to rank each other when they have but little experience with or knowledge about each other. Activity presumably should be more associated with assertiveness in this case than when a person knows the other better, and presumably takes activity into account in his assessment. It should be emphasized that in this analysis there is *one* quite dominant factor rather than the two that occurred in the BCM study, and this factor is Individual assertiveness (Table A).

Sociability (Factor II, Table A) is again found prominently and the definition is as it occurs in the BCM study, with connotations both of

TABLE 1 (continued)

18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
20	48	-01	67	47	28	50	66	48	58	53	42	55	07	52	44	38	17	38
-29	54	69	42	38	42	50	-07	18	37	55	11	48	56	54	05	55	-29	28
-14	75	40	88	69	50	87	23	57	69	70	35	88	35	92	36	72	-10	59
31	54	05	60	71	-01	37	45	68	50	56	85	43	-09	30	73	07	13	-05
15	-47	-12	-40	-30	-22	-33	-33	-30	-24	-30	-17	-52	-22	-38	-04	-39	-04	-37
06	71	19	75	67	32	69	46	63	69	63	52	69	11	63	55	43	11	39
33	28	-16	29	44	11	22	45	57	39	30	48	25	-09	16	32	11	30	18
11	73	32	89	74	46	73	34	65	74	73	50	82	24	74	56	52	02	51
44	10	-30	22	43	-14	04	60	54	20	36	68	01	-40	-05	63	-30	31	-06
-13	22	55	44	02	76	44	-11	04	50	34	-18	42	47	51	03	66	-16	37
18	29	-05	52	31	37	44	50	38	46	34	18	41	-05	43	23	38	20	59
46	38	-05	47	66	03	25	48	67	46	49	85	26	-15	18	81	-04	27	-03
45	41	-23	54	63	01	28	67	70	47	45	78	34	-18	21	65	01	30	09
17	63	32	72	69	38	59	35	61	59	72	54	56	15	52	55	36	01	26
00	-41	10	-26	-28	12	-20	-36	-22	-01	-22	-21	-33	-05	-21	03	-14	-02	-06
40	-63	-43	-49	-43	-35	-63	-06	-25	-56	-37	-16	-57	-54	-57	-07	-66	17	-37
-55	54	63	39	36	46	59	-27	16	41	33	-04	50	65	62	04	67	-40	30
23	-11	-47	01	10	-19	-24	35	35	17	08	38	-18	-47	-28	45	-44	32	-26
-26	51	40	73	79	37	73	18	64	58	67	44	77	34	71	35	58	-10	32
25	71	30	39	20	58	51	-28	06	25	31	-14	47	55	57	00	65	-45	38
29	79	37	74	18	65	28	85	59	72	72	63	15	63	61	36	04	34	56
-05	42	46	46	38	56	04	15	49	41	-08	55	42	59	13	70	-04	56	57
10	72	50	77	75	53	02	51	62	69	26	78	35	88	30	78	-21	57	07
54	34	-19	47	43	08	27	48	29	22	49	11	-11	04	44	-07	39	07	32
47	58	08	62	66	16	55	48	59	60	76	52	-05	50	64	21	16	32	37
29	61	24	70	61	38	60	41	48	55	44	68	33	66	52	48	01	39	38
11	75	48	77	75	61	82	23	50	65	53	60	22	67	48	52	-10	38	38
48	58	00	59	67	10	46	64	65	54	45	30	-12	19	73	-04	34	-03	59
10	75	47	82	76	49	84	30	54	62	80	50	38	88	28	73	-09	59	36
-28	19	42	20	06	51	25	-17	-14	15	30	-19	23	43	-15	66	-26	36	62
14	74	47	86	76	56	85	31	53	64	84	49	88	29	25	80	-23	62	61
37	44	05	59	55	17	48	42	67	58	46	56	52	-11	47	01	18	01	00
-07	57	50	61	56	61	69	06	24	47	65	26	66	49	69	25	-31	60	60
33	-23	-61	08	01	-10	-08	43	15	07	-10	20	-09	-29	-11	20	-24	-11	-
15	33	15	46	35	39	40	40	25	34	32	31	41	24	45	28	42	11	-

friendliness, likeability, and supporting other individuals. This identification is not of the same overriding magnitude as Factor 1, however.

Manifest intelligence (Factor III, Table A) again occurs as a factor, and the definition is reasonably clear, with the variables having the highest loadings being Intelligence, Independence, and Rationality and logic. From the previous analysis it was difficult to interpret what it was that constituted being recognized as manifestly intelligent, i.e., intelligence or an attitude of independence. Both Items 12 and 19, designed to represent these two possible meanings, occur in the current definition of Manifest intelligence.

Factor IV is defined by: Tends to be nervous, Is very tense, Emotionality, and Gets upset easily, is quite clearly the Manifest emotionality factor derived in the previous study.

The fifth factor is defined by: Orderliness, Pays attention to the task, Responsibility, and Conservativeness. Again, this represents the same kind



of cluster as in the BCM study to represent the factor of Task interest. It should be noted, however, that the definition is not a clear-cut one with large loadings, and this was also the case in the previous analysis.

TABLE 2  
ORTHOGONAL ROTATED FACTORS:  
POST-MEETING MALE DATA

	I	II	III	IV	V	VI	$h^2$
1. Shows solidarity and friendliness	44	62	11	-22	04	36	77
2. Disagrees often	63	-44	17	01	05	06	63
3. Is very active	89	13	11	04	-20	01	86
4. Intelligence	60	40	50	-11	04	-15	81
5. Is very tense	-26	-33	-06	64	02	-12	60
6. Directiveness	77	31	09	-21	15	-03	76
7. Social sensitivity	-01	20	23	12	01	07	11
8. Initiative	89	24	13	01	-03	-02	87
9. Orderliness	12	48	09	-05	64	-06	67
10. Gets upset easily	36	-44	14	40	-19	16	56
11. Is very responsive to humor	39	37	09	-11	-07	46	53
12. Rationality and logic	56	52	38	-15	15	-27	85
13. Makes others feel he understands them	37	69	15	-12	03	11	66
14. Perseverance	86	-03	12	13	03	-02	77
15. Tends to be very nervous	-13	-37	-04	75	-02	-02	72
16. Conservativeness	-48	22	-35	-10	30	-06	51
17. Tends to be antagonistic	61	-48	16	15	-05	17	68
18. Trustworthiness	08	57	27	-01	24	05	46
19. Independence	78	02	45	-04	10	-04	82
20. Dismisses the opinion of others	55	-58	18	14	06	-01	69
21. Makes many suggestions	86	29	08	-01	01	11	84
22. Self-reliance	80	26	33	-14	03	-08	84
23. Emotionality	56	-11	09	48	-16	32	69
24. Authoritarian	91	05	02	08	05	00	84
25. Likeability	26	67	25	-17	05	32	71
26. Responsibility	56	45	14	-16	42	-04	74
27. Inquisitiveness	65	26	26	07	10	12	59
28. Intensity	86	05	21	15	-05	-02	81
29. Clearmindedness	50	56	31	-25	09	-11	74
30. Assertiveness	91	09	05	-01	-05	-02	84
31. Tends to be erratic	32	-41	-03	26	-22	32	49
32. Does most of the talking	93	08	06	03	-12	02	89
33. Pays attention to the task	53	44	03	-04	44	01	67
34. Interrupts others	78	-20	01	08	-24	17	74
35. Supports other's suggestions	-17	76	-21	11	-04	07	67
36. Discusses things in personal terms	45	21	07	04	-12	36	40

Note: Decimal points omitted.

TABLE A  
POST-MEETING MALE DATA

Variable	Loading
<i>Factor I, Individual Assertiveness</i>	.93
32. Does most of the talking	.91
30. Assertiveness	.91
24. Authoritarian	.89
8. Initiative	.89
3. Is very active	.86
14. Perseverance	.86
21. Makes many suggestions	.86
28. Intensity	.80
22. Self-reliance	.78
34. Interrupts others	.78
19. Independence	.77
6. Directiveness	.65
27. Inquisitiveness	.63
2. Disagrees often	.61
17. Tends to be antagonistic	.60
4. Intelligence	.56
26. Responsibility	.56
12. Rationality and logic	.55
20. Dismisses the opinion of others	.53
33. Pays attention to the task	.50
29. Clearmindedness	.76
<i>Factor II, Sociability</i>	.69
35. Supports other's suggestions	.67
13. Makes others feel he understands them	.62
25. Likeability	-.58
1. Shows solidarity and friendliness	.57
20. Dismisses the opinion of others	.56
18. Trustworthiness	.52
29. Clearmindedness	.50
12. Rationality and logic	.45
<i>Factor III, Manifest Intelligence</i>	.38
4. Intelligence	-.35
19. Independence	.33
12. Rationality and logic	.31
16. Conservativeness	.75
22. Self-reliance	.64
29. Clearmindedness	.48
<i>Factor IV, Manifest Emotionality</i>	.40
15. Tends to be very nervous	.64
5. Is very tense	.44
23. Emotionality	.42
10. Gets upset easily	.30
<i>Factor V, Task Interest</i>	.46
9. Orderliness	.36
33. Pays attention to the task	.36
26. Responsibility	.32
16. Conservativeness	.32
<i>Factor VI, Responsiveness</i>	.32
11. Is very responsive to humor	.32
1. Shows solidarity and friendliness	.32
36. Discusses things in personal terms	.32
23. Emotionality	
25. Likeability	
31. Tends to be erratic	

Note: Loadings below .50 may be examined in the table of orthogonal rotated factors for Factors I and II, and loadings below .30 for Factors III-VI.

The sixth factor had low loadings, and definition is quite tenuous. What is of interest in this factor is that it involves both indications of emotionality and also items that have to do with friendliness. The kind of descriptive name that seems to be appropriate for this factor is one of Volatility or Responsiveness.

It is necessary to emphasize that Individual assertiveness is a quite dominant first factor. For this reason it is difficult to interpret the meaning of the correlation of items on the factors. In particular, there is no factor beyond the first that doesn't have some items that are heavily loaded on the first factor. In making of behavioral characteristics rankings the first point that must be stressed is that noticeability may be first of all an indication of assertiveness, and beyond that an indication of other characteristics. In the BCM study it was found that the first two factors were dominant, although the second did not account for as much variance as the first. In other words, the same arrangement is found here although the first factor is more prominent. As an illustration of the dependence of the items on the dominant factors involved, note that Factor III, Manifest intelligence, has four items (Intelligence, Rationality and logic, Self-reliance, and Clearmindedness) that have loadings in Factor I and Factor II.

On the other hand, the definition of Manifest emotionality, particularly in terms of: Is very tense, and Tends to be nervous, is relatively independent of Factor I, while three of the four variables defining the Manifest emotionality factor are negatively related to Factor II, Sociability. This is of particular interest, since in the BCM study the items in the Manifest emotionality factor were associated with Individual assertiveness rather than Sociability. Note that this does not suggest that there isn't independent content identifiable as emotionality, but only that, in this sample of male subjects who have had only limited contact, items that define Manifest emotionality are inclined to be identified with a negative pole of Sociability.

In terms of replication of the structure in the BCM study, it appears that the main differences that occur are attributable fairly directly to the types of groups that were making the rankings; namely, the groups in the current study were created on an ad hoc basis from a population of male subjects. Under these conditions it would be expected that noticeability would be more important and more associated to assertiveness than in the BCM study. As a consequence of this, subsequent factors, since they depend upon noticeability also, would involve items that were jointly loaded on the Individual assertiveness factor. The five factors from the previous study, however, clearly existed in this replication.



## C. A SECOND REPLICATION

The second replication of the BCM study is very much like the first, the major differences being in sample size, in this case  $N = 63$ , and the fact that the subjects were females. The experimental conditions were identical for the females, but there was one minor variation in so much as two of the 13 groups observed were four-person groups, and the data have been adjusted to take this into account. The justification for this replication arises out of informal rather than formal theoretical considerations. In particular, it has been observed facetiously and sometimes more seriously that most of the subjects on which small group research is based are quite different, being students, or soldiers, or others, but most commonly *males*. The question often raised is whether this is a factor that limits generalization on small group research.

The research conducted at New York University required development of observer skills, as well as development of general experience with the experimental procedure. Since development of an adequate subject pool of all male subjects did not reach bountiful proportions, it was decided to utilize female subjects as the "first run" experimentally, thus providing the experience while producing certain types of replications that were not dependent on the direct observation techniques being trained. This constitutes the source of data reported for this study.

Data treatment for the post-meeting rankings of the five-person groups composed of females was treated in exactly parallel fashion to the male data. The intercorrelations are presented above the main diagonal in Table 1. Of the extracted factors, the first 7 were retained for rotation, and the orthogonal rotated factors are presented as Table 3. It will be noted in the case of the female data that 7 rather than 6 factors were retained for rotation.

The definition of the first factor in the female data is very much like that in the male data. For example: Does most of the talking, Is very active, Assertiveness, and Authoritarian, are the four items with the largest loadings in the female data. These occur with loading of .90 or greater, and they also occur with loadings of .89 or greater in the male data and are among the top five loadings for the male data. While this definition is quite clear, however, there are some fairly pronounced shifts in the factor loadings of the items that are involved. Some variability would be expected on a chance basis alone, but some variability may be of a systematic kind. For example, items that define Manifest intelligence in the male data

TABLE 3  
ORTHOGONAL ROTATED FACTORS:  
POST-MEETING FEMALE DATA

	I	II	III	IV	V	VI	VII	$h^2$
1. Shows solidarity and friendliness	53	57	39	-18	00	09	-07	81
2. Disagrees often	61	-34	00	00	49	11	-01	73
3. Is very active	92	12	20	-12	-12	-06	-07	93
4. Intelligence	31	-12	84	-20	06	09	-10	88
5. Is very tense	-45	-29	-07	52	-18	-07	-17	62
6. Directiveness	66	20	50	-22	08	02	00	78
7. Social sensitivity	19	33	50	02	-04	04	47	62
8. Initiative	79	18	43	-03	00	-12	-21	90
9. Orderliness	-10	13	79	00	17	-20	00	71
10. Gets upset easily	57	13	-25	54	18	15	-04	75
11. Is very responsive to humor	46	70	14	05	-10	-11	10	75
12. Rationality and logic	17	-05	91	09	10	03	-05	88
13. Makes others feel she understands them	21	26	81	-09	-12	09	21	84
14. Perseverance	58	-04	55	02	32	-19	-12	79
15. Tends to be very nervous	-23	-15	-12	74	-02	-03	07	65
16. Conservativeness	-68	10	03	13	-01	-35	-05	61
17. Tends to be antagonistic	65	-47	-20	08	02	27	09	77
18. Trustworthiness	-30	33	56	19	-10	-16	-10	59
19. Independence	78	-15	32	-28	-02	06	05	82
20. Dismisses the opinion of others	61	-38	-25	22	33	03	-01	74
21. Makes many suggestions	85	13	38	05	-06	-03	-12	90
22. Self-reliance	62	-18	64	-13	-14	-12	14	90
23. Emotionality	67	19	-16	47	23	06	04	79
24. Authoritarian	90	-07	12	-01	-06	-12	07	85
25. Likeability	05	57	57	-19	21	17	22	76
26. Responsibility	48	03	71	-01	-18	-17	22	84
27. Inquisitiveness	70	18	37	21	-11	24	-10	78
28. Intensity	68	-05	43	01	18	-21	02	73
29. Clearmindedness	18	-06	90	-06	-08	09	05	86
30. Assertiveness	91	06	12	-10	-13	02	-04	88
31. Tends to be erratic	54	-19	-31	07	21	43	04	66
32. Does most of the talking	95	-03	03	01	-10	-10	-03	93
33. Pays attention to the task	23	01	81	21	-06	00	-19	79
34. Interrupts others	87	-01	-25	07	11	14	18	89
35. Supports other's suggestions	-23	38	34	02	-12	12	07	35
36. Discusses things in personal terms	65	28	-16	08	03	-21	24	63

Note: Decimal points omitted.

TABLE B  
POST-MEETING FEMALE DATA

Variable	Loading
<i>Factor I, Individual Assertiveness</i>	
32. Does most of the talking	.95
3. Is very active	.92
30. Assertiveness	.91
24. Authoritarian	.90
34. Interrupts others	.87
21. Makes many suggestions	.85
8. Initiative	.79
19. Independence	.78

TABLE B (continued)

Variable	Loading
<i>Factor I, Individual Assertiveness (continued)</i>	
27. Inquisitiveness	.70
16. Conservativeness	— .68
28. Intensity	.68
23. Emotionality	.67
6. Directiveness	.66
17. Tends to be antagonistic	.65
36. Discusses things in personal terms	.65
22. Self-reliance	.62
2. Disagrees often	.61
20. Dismisses the opinion of others	.61
14. Perseverance	.58
10. Gets upset easily	.57
31. Tends to be erratic	.54
1. Shows solidarity and friendliness	.53
<i>Factor II, Sociability</i>	
11. Is very responsive to humor	.70
1. Shows solidarity and friendliness	.57
25. Likeability	— .47
17. Tends to be antagonistic	— .38
20. Dismisses the opinion of others	.38
35. Supports other's suggestions	— .34
2. Disagrees often	.33
7. Social sensitivity	.33
18. Trustworthiness	
<i>Factor III, Manifest Intelligence</i>	
12. Rationality and logic	.91
29. Clearmindedness	.90
4. Intelligence	.84
13. Makes others feel she understands them	.81
33. Pays attention to the task	.81
9. Orderliness	.79
26. Responsibility	.71
22. Self-reliance	.64
25. Likeability	.57
18. Trustworthiness	.56
14. Perseverance	.55
6. Directiveness	.50
7. Social sensitivity	.50
<i>Factor IV, Manifest Emotionality</i>	
15. Tends to be very nervous	.74
10. Gets upset easily	.54
5. Is very tense	.52
23. Emotionality	.47
<i>Factor V, Disagreeableness</i>	
2. Disagrees often	.49
20. Dismisses the opinion of others	.33
14. Perseverance	.32
<i>Factor VI, Lack of Control</i>	
31. Tends to be erratic	.43
16. Conservativeness	— .35
<i>Factor VII, Social Sensitivity</i>	
7. Social sensitivity	.47

Note: Loadings below .50 may be examined in the table of orthogonal rotated factors for Factors I and III, and loadings below .30 for Factors II, IV, V, VI, and VII.



occur among those loadings of .5 or greater in the male data, but not in the female data. On the other hand, items that are indicators of Manifest emotionality occur in the female data at the same level but do not occur in the male data.

The definition of the subsequent factors, however, is not as clear as the case for Factor I. For example, the factor that we would call Sociability (Factor II) has a different and less prominent definition in the female data. Shows solidarity and friendliness, and Likeability, are two of the highest items that occur in this factor for the female data, and they also occur among the largest loadings for the male data. On the other hand, Is very responsive to humor, has a loading of .70 in this factor for the female data while it has only the much smaller loading of .37 in the male data. There are other differences, and these can be seen by systematically exploring the arrangement of factor loadings.

Possibly of greater interest is the definition of Factor III in the female data. In the female data this factor, identified as Manifest intelligence, has a most prominent definition. The three highest loadings occur for Rationality and logic, Clearmindedness, and Intelligence. Pays attention to the task, Orderliness, and Responsibility, that occurred as important items in the definition of task interest in the male data, occur with quite high loadings in the Manifest intelligence factor in the female data and apparently have no independent definition of this factor. In other words, Manifest intelligence and Task interest appear to be merged in the rankings made among the females. It should be noted that in general the items defining Manifest intelligence (and Task interest) have slight positive loadings on Factor I in the female data. There are items, however, such as Likeability, that have substantial loadings on this Manifest intelligence factor and Sociability. On the other hand, Makes others feel she understands them, has a high loading on this factor in the female data, while it was a most prominent item in the Sociability factor in the male data.

The factor structure as described thus far might very well lead to interesting speculation. For example, the heavier loading in the female data for Factor III indicates several possibilities. Manifest intelligence may be a quality that is more independent from Assertiveness among females than it is among males, or Manifest intelligence may be more easily identified as independent of Assertiveness by females than males, or females may (pre) conceive of Manifest intelligence as independent of Assertiveness more than males do. Among females Manifest intelligence seems to be defined in more abstract concepts independently of Task interest.

Factor IV, Manifest emotionality, occurs in the female data with a similar definition to that in the male data. In fact, the same four variables appear to define the factor, although the arrangement of the loadings is somewhat different.

The definition of the additional three factors found in the female data is quite tenuous. Factor V, for example, we could provisionally identify as Disagreeableness. If such a factor were a stable one, it would indicate that Disagreeableness had some independent content from Sociability and also from Manifest emotionality. Factor VI might be called Lack of control, and Factor VII has only one item with a substantial loading, Social sensitivity.

It should be noted that in the female data Social sensitivity has an  $h^2$  of .62, and that the variance contributing to this  $h^2$  is spread among several factors. On the other hand, this variable has an  $h^2$  of only .11 in the male data. The only other very large discrepancy in terms of saturation occurs for Supports other's suggestions, which has an  $h^2$  of .67 in the male data, and only .35 in the female data. In general, the saturations involved for these variables, even ignoring that six factors are compared to seven factors, are correlated .67 for the two sets of data. This correlation is substantial since the range of the saturations involved is fairly restricted.

In summary, thus, while we can meaningfully compare the results of the male data and the female data and some direct replication occurs, some substantial differences occur also. This suggests a caution on the hasty generalization of small group research without taking into account such gross variables as sex, for if only the difference in the subjects by using females instead of males will alter the data systematically as much as occurred here, one wonders what the consequences are where more radical situational differences are involved. On the other hand, one can only be encouraged by the fact that in the replication of the BCM study, the male data seem to replicate the five factors reasonably clearly and the female data replicate four of the factors. Certainly additional studies are required before findings in this area can be considered firm.

#### D. ANALYSIS OF SELF-RANKINGS

The scores with which we have dealt at this point have been the average rankings that an individual receives from the group members. As such, only agreement in assessment is distilled into the score. It is possible to extend the question of the frames of reference utilized in making these

TABLE 4  
INTERCORRELATION MATRIX

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	—	—13	42	25	—21	13	—02	24	29	—12	33	27	52	22	—27	—08	—35	34	20
2	10	—	23	33	16	27	07	21	—17	04	06	02	—15	06	—02	—13	28	—08	19
3	16	38	—	39	—24	41	—10	51	08	—17	27	20	20	21	—29	—22	—06	25	36
4	43	30	32	—	—12	47	—04	39	05	—19	37	32	15	19	—31	—14	—04	17	28
5	—28	19	—13	—09	—	—21	29	—21	—18	28	—16	—09	—12	—13	62	15	13	—14	01
6	34	11	46	37	—24	—	—08	57	20	—11	22	13	09	32	—18	—09	11	20	36
7	—26	09	—01	—04	40	—19	—	—09	07	23	—09	04	09	00	23	19	13	—14	—01
8	26	35	49	60	—23	48	—10	—	20	—07	20	15	15	43	—27	—05	00	14	35
9	36	—12	13	32	—21	49	—13	32	—	—18	22	16	25	30	—18	09	—13	21	19
10	—19	38	34	—05	36	01	24	04	—25	—	—17	—15	—12	—19	34	00	10	—09	—19
11	24	—06	13	14	—30	12	08	23	03	—05	—	40	24	08	—30	—09	—21	22	11
12	40	27	38	74	—11	42	—01	57	34	—03	14	—	36	15	—14	—03	—25	29	26
13	36	02	25	30	—27	29	—15	27	33	—18	12	26	—	20	—19	—08	—25	24	25
14	15	36	36	33	—02	39	03	45	14	17	11	25	27	—	—05	13	—09	25	22
15	—29	01	—02	—15	64	—32	29	—19	—19	29	—20	—08	—15	00	—	10	08	—23	—12
16	05	—34	—11	—21	—18	13	—12	—13	11	—23	—07	—16	08	—08	—15	—	04	07	—01
17	00	38	39	20	25	13	14	24	—12	40	00	22	—04	32	22	—26	—	—14	13
18	18	02	09	21	—18	30	—23	18	23	—18	09	18	28	08	—15	11	—12	—	26
19	14	39	32	54	—19	31	—04	61	09	07	09	48	05	31	—14	—27	25	16	—
20	—09	24	10	09	19	10	12	12	—10	47	—08	09	—04	30	17	—17	46	—06	19
21	27	37	53	42	—21	56	—19	52	35	00	16	47	41	47	—23	—03	24	22	35
22	30	26	39	53	—22	45	—11	53	38	—02	07	48	08	38	—26	—13	19	22	56
23	—04	28	25	11	30	—01	23	09	—14	65	01	04	—02	15	39	—17	36	—14	15
24	23	35	55	25	—13	34	—16	38	21	20	10	29	22	49	—12	—11	34	02	22
25	39	03	09	31	—14	25	—27	30	26	—12	60	28	36	01	—18	16	—09	42	17
26	25	03	21	34	—22	47	05	32	51	—16	01	31	26	19	—26	20	—06	44	27
27	19	32	44	44	—05	19	—20	40	10	14	23	41	28	33	00	—16	30	16	33
28	25	41	38	50	00	32	—02	47	12	31	12	48	15	34	01	—30	40	09	44
29	33	15	18	58	—23	44	—19	52	27	—13	12	58	20	21	—20	—07	04	28	46
30	35	42	49	43	—13	48	—01	45	20	24	04	53	25	45	—13	—20	32	06	35
31	03	22	02	—01	29	06	11	—06	—14	25	—08	—11	—10	09	22	—05	18	—12	—01
32	25	36	65	43	—18	40	—08	57	24	25	18	47	20	46	—08	—12	41	—01	36
33	34	06	25	41	—18	28	—08	20	34	—12	15	34	26	14	—13	06	04	20	22
34	02	39	23	12	13	06	—05	19	—08	23	—05	11	—04	26	17	—29	39	—07	29
35	16	—39	—22	—21	—11	—02	—07	—20	10	—28	11	—10	08	—13	05	27	—22	11	—30
36	01	—02	13	—23	—19	14	—02	—07	—19	12	21	—08	—06	13	—01	—09	19	—07	06
37	29	04	38	26	—05	42	—08	28	42	—12	16	34	36	19	—02	02	05	07	11
38	28	40	36	59	—07	46	01	55	23	17	19	53	03	39	—14	—21	28	08	46
39	05	09	24	15	16	12	12	11	07	43	—09	09	—04	12	17	—01	32	00	03
40	39	17	58	51	—28	57	—09	59	46	—06	20	56	46	38	—18	01	18	27	41

Note. Male self-ranking data are below the main diagonal and self-assessment (rating) data are above the diagonal. Decimal point omitted.

assessments further by asking what the structure of rankings is if one considers only the self-ranking within the group. This constitutes the next analysis reported here.

From the sample of male data, by random procedure a subsample of 100 cases was selected for analysis of self-rankings only. The self-rankings were intercorrelated, and the matrix is presented below the diagonal in Table 4. As in the previous analyses, the Complete Centroid Technique was used to factor the matrix and the orthogonal rotated factors are presented in Table 5. For this analysis all 40 variables on which group members ranked each other were utilized.

The factor that corresponds most directly to the items used to define Individual assertiveness in the previous analyses also includes the items that are commonly used to identify the intelligence items, and it becomes necessary to call the Factor I in these data Intelligence assertiveness (Table



TABLE 4 (continued)

20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
-16	34	24	05	17	64	38	18	04	29	31	-15	12	21	-04	32	18	32	07	05	30
11	34	21	09	16	-07	-06	25	31	10	15	04	20	09	22	04	05	-02	24	06	08
-13	57	34	-05	30	43	31	35	30	32	40	-04	40	42	09	10	08	33	25	09	29
-09	41	41	02	17	23	28	43	41	48	46	-04	24	29	04	23	17	12	45	12	38
19	-20	-19	32	-02	-23	-25	-16	12	-23	-15	28	-08	-09	19	06	05	-21	01	13	-17
-16	48	40	04	24	18	26	36	41	34	49	-09	24	30	-03	16	13	26	42	18	34
03	-09	-01	29	-07	-16	01	03	13	01	-10	12	-17	-13	00	06	05	-14	10	01	-03
-08	55	44	05	29	21	45	45	37	40	56	-07	30	30	09	17	08	30	38	14	41
-19	14	27	09	01	22	47	-07	-05	29	19	-27	02	22	-16	20	12	32	07	09	28
08	-15	-28	36	-07	-09	-17	-06	08	-25	-15	29	03	-23	11	-07	02	-15	-19	-10	-12
-18	29	29	01	03	47	34	19	15	36	26	-18	19	22	06	28	18	20	20	07	32
-30	12	32	-17	-09	35	30	13	13	57	25	-20	-11	36	-10	27	-11	30	26	-01	28
-28	20	28	04	01	45	44	10	02	37	28	-24	00	29	-15	26	21	38	08	04	42
-14	40	37	00	19	15	45	24	24	30	43	-20	08	35	-08	12	-08	28	26	22	25
-20	-26	-27	16	-14	-33	-31	-20	04	-31	-17	31	-09	-10	-03	-12	-11	-18	-09	07	-30
09	-17	05	00	03	-08	14	-02	-01	02	-05	-11	-25	-05	-12	07	-13	01	-03	05	-01
25	04	-01	03	19	-28	-10	07	10	-09	01	12	11	-21	30	-12	02	-22	01	00	-09
-25	20	30	-01	06	31	39	11	03	28	19	-17	-07	35	-11	14	09	35	16	04	31
08	44	51	-07	10	18	35	39	30	40	45	-09	15	36	09	13	00	19	34	10	32
-06	-03	-09	09	-16	-22	08	06	-21	-09	17	10	-18	19	-13	09	-27	-09	-10	-19	-19
11	-	50	08	30	25	40	44	33	36	55	-08	43	27	19	15	21	30	29	22	40
17	43	-	-05	14	27	56	25	24	57	51	-24	12	38	-01	15	03	37	34	05	54
41	-02	-03	-	03	03	04	05	17	-13	03	04	42	04	34	11	18	26	-03	03	17
20	44	43	02	-	14	15	18	11	-03	33	04	42	04	34	11	18	26	-03	03	17
-13	18	22	-06	10	-	41	09	09	31	29	-09	09	23	-12	26	22	33	12	01	31
-07	25	43	-10	26	30	-	27	24	59	44	-34	05	40	-04	30	13	47	24	08	26
11	42	27	11	29	18	05	-	51	33	40	05	24	20	16	19	05	18	30	08	26
-25	38	35	38	40	08	13	38	-	29	41	12	11	22	08	25	08	07	48	16	25
-01	36	46	-06	15	34	42	23	34	-	51	-28	-02	43	-03	32	00	34	34	10	60
39	59	50	20	51	08	22	19	48	32	-	-07	26	37	11	20	09	32	36	23	48
30	-07	-03	19	12	-07	12	05	10	-10	09	-	09	-27	22	-15	03	-24	-02	07	-17
17	53	45	22	54	04	15	27	52	24	63	11	-	09	41	02	22	05	10	15	08
-11	23	41	-11	20	19	33	24	17	25	16	-07	16	-	-05	08	-02	44	27	14	34
18	23	15	23	30	-09	-02	16	34	26	30	23	35	-08	-	10	19	-13	03	23	-06
-31	-13	-27	-18	-12	05	01	-14	-19	-07	-13	-16	-15	02	-19	-	18	14	22	09	28
09	09	-06	-03	18	-09	-11	-03	04	-04	14	20	18	-03	35	05	-	05	11	12	08
-23	42	23	00	25	08	20	32	24	23	32	-01	35	49	15	10	09	-	24	15	41
02	53	58	23	25	13	18	27	53	45	48	-03	49	13	25	-34	01	21	-	31	29
20	03	14	32	17	-04	09	-12	22	04	25	13	33	13	03	-13	-09	04	11	-	19
-03	62	46	-01	49	30	39	47	36	40	46	-13	50	46	12	-07	04	61	41	10	-

C). To make a surface interpretation, it would appear that in self-rankings persons view themselves as assertive only when the assertiveness is presumably an intelligent and appropriate kind of behavior. When viewing others, persons apparently are able to distinguish between what is intelligent behavior and what is more directly assertive behavior. Since the Individual assertiveness factor and the Manifest intelligence factor appear to have merged in Factor I, we can not expect a separate factor for intelligence. The second factor is clearly that of Sociability. It should be noted, however, that the loadings are quite small and indicate that the items involved are probably not viewed in the same way as consistently as when one is ranking an array of individuals.

We have provisionally identified the third factor as describing Authoritarian behavior, although opinionateness might be a better kind of identification. The loadings for this factor are relatively small, however, and one would have to be careful in interpreting the meaning. It may be, for example,

that this factor arises not in terms of being authoritarian, but the opposite pole. That is, some persons may consistently view themselves as not discussing things in personal terms, not being authoritarian, and not inter-

TABLE 5  
ORTHOGONAL ROTATED FACTORS:  
POST-MEETING MALE  
SELF-RANKING DATA

	I	II	III	IV	V	VI	VII	$h^2$
1. Shows solidarity and friendliness	35	39	-07	-13	29	-14	00	40
2. Disagrees often	47	07	24	27	-16	21	-23	48
3. Is very active	60	-14	20	27	33	-13	02	62
4. Intelligence	75	27	-35	-03	05	15	-10	79
5. Is very tense	-20	-07	-04	33	-06	73	-05	70
6. Directiveness	57	21	14	-01	20	-16	41	62
7. Social sensitivity	-06	35	-14	29	-02	25	05	29
8. Initiative	78	06	-07	01	01	-13	00	63
9. Orderliness	38	08	-15	-26	32	01	40	51
10. Gets upset easily	07	-06	10	82	-06	05	-01	70
11. Is very responsive to humor	15	00	-13	03	24	-39	-17	28
12. Rationality and logic	72	17	-22	-07	16	14	-07	65
13. Makes others feel he understands them	24	36	09	-17	47	-05	05	45
14. Perseverance	50	05	29	18	11	02	03	38
15. Tends to be very nervous	-23	-09	-06	39	11	57	-11	56
16. Conservativeness	-25	09	01	-20	19	-14	42	34
17. Tends to be antagonistic	34	03	22	48	04	19	-17	47
18. Trustworthiness	19	43	-06	-21	05	-09	26	34
19. Independence	68	12	-07	05	-28	-08	-07	57
20. Dismisses the opinion of others	17	16	21	52	-17	15	03	42
21. Makes many suggestions	67	10	27	-09	25	-06	-02	60
22. Self-reliance	76	02	01	-04	-14	-04	23	65
23. Emotionality	09	05	-13	75	03	10	-09	60
24. Authoritarian	52	01	44	13	22	-08	01	54
25. Likeability	20	47	-18	-15	11	-11	19	38
26. Responsibility	42	13	-07	-19	04	-03	58	57
27. Inquisitiveness	44	27	-02	04	23	-01	-33	44
28. Intensity	59	17	-02	36	06	03	-20	55
29. Clearmindedness	62	30	-15	-22	-14	02	05	57
30. Assertiveness	64	11	33	21	14	05	04	60
31. Tends to be erratic	-04	13	25	33	-08	18	00	23
32. Does most of the talking	67	-14	22	29	25	-12	-05	68
33. Pays attention to the task	38	12	-15	-16	34	00	15	34
34. Interrupts others	33	02	42	20	-13	16	-25	43
35. Supports other's suggestions	-32	08	-03	-25	36	-04	08	31
36. Discusses things in personal terms	01	-01	45	12	04	-22	-12	28
37. Interested in getting things done	40	03	02	-11	56	09	04	49
38. Acuteness	73	03	-09	15	-13	-04	-06	58
39. Rigidity	17	-10	-07	46	13	16	27	37
40. Tends to direct when necessary	69	05	02	-12	48	-08	12	75

Note: Decimal points omitted.

TABLE C  
POST-MEETING MALE SELF-RANKING DATA

Variable	Loading
<i>Factor I, Intelligent Assertiveness</i>	
8. Initiative	.78
22. Self-reliance	.76
4. Intelligence	.75
38. Acuteness	.73
12. Rationality and logic	.72
40. Tends to direct when necessary	.69
19. Independence	.68
21. Makes many suggestions	.67
32. Does most of the talking	.67
30. Assertiveness	.64
29. Clearmindedness	.62
3. Is very active	.60
28. Intensity	.59
6. Directiveness	.57
24. Authoritarian	.52
14. Perseverance	.50
<i>Factor II, Sociability</i>	
25. Likeability	.47
18. Trustworthiness	.43
1. Shows solidarity and friendliness	.39
13. Makes others feel he understands them	.36
7. Social sensitivity	.35
29. Clearmindedness	.30
<i>Factor III, Authoritarian</i>	
36. Discusses things in personal terms	.45
24. Authoritarian	.44
34. Interrupts others	.42
4. Intelligence	-.35
30. Assertiveness	.33
<i>Factor IV, Manifest Emotionality</i>	
10. Gets upset easily	.82
23. Emotionality	.75
20. Dismisses the opinion of others	.52
17. Tends to be antagonistic	.48
39. Rigidity	.46
15. Tends to be very nervous	.39
28. Intensity	.36
5. Is very tense	.33
31. Tends to be erratic	.33
<i>Factor V, Task Interest</i>	
37. Interested in getting things done	.56
40. Tends to direct when necessary	.48
13. Makes others feel he understands them	.47
35. Supports other's suggestions	.36
33. Pays attention to the task	.34
3. Is very active	.33
9. Orderliness	.32
<i>Factor VI, Tenseness</i>	
5. Is very tense	.73
15. Tends to be very nervous	.57
11. Is very responsive to humor	-.39
<i>Factor VII, Responsibility</i>	
26. Responsibility	.58
16. Conservativeness	.42
6. Directiveness	.41
9. Orderliness	.40
27. Inquisitiveness	-.33

Note: Loadings less than .50 may be examined in the Table of Orthogonal Rotated Factors for Factor I, and loadings less than .30 for Factors II-VIII.



rupting others, and not being assertive, but being intelligent. The caricature is of the individual who is reserved and considerate, and this may be the frame of reference that determines the association of the items in the self-rankings.

Factor IV has been identified as Manifest emotionality on the grounds that it involves the four items that have commonly recurred in the definition in the other analyses. It should be noted, however, that additional items occur here, and these include items such as rigidity and intensity, which indicate a different connotation. On the other hand, as will be seen when we discuss Factor VI, the content of what has previously been viewed as emotionality has been divided. Here emotionality means getting upset easily, and presumably also unreasonableness on an emotional plane.

Factor V appears to correspond to our definition of a Task interest factor. There is nothing particularly unique about this definition, except that it should be noted as coexisting with Factor VII in this data which seems to describe a view of the self as responsible.

The sixth factor we have defined simply as Tenseness. It is defined by only three variables, Is very tense, Tends to be very nervous, and absence of Is very responsive to humor. What is particularly interesting about this definition is that in viewing oneself it is apparently possible to distinguish between being tense and being emotional. The connotation in the tenseness factor seems to be one of inadequacy in the sense of feeling under pressure, whereas the definition of Manifest emotionality tends to be one of intense-ness, and of lack of emotional control. When making rankings of others, however, apparently these views are merged, or possibly, Tenseness in the sense indicated here is not visible.

The last factor from the male self-ranking data seems to describe characteristics that are associated with a view of the self as responsible, or possibly as responsibly conservative. It is defined primarily by trait names, and this is in contrast to Factor V, Task interest, which was defined primarily by descriptive phrases having to do with the task or with task functions.

Thus, there are important similarities and differences in the factor structure when one views self-rankings and the rankings made of individuals that are based on a consensus type measure. The differences reported here are easily interpretable in terms of what might be called the biases of self-perception.

Another kind of information about the biases of self-perception extracted from these data is the average self-ranking that a person assigns to himself. Average self-rankings of the subsample of males are indicated in Table 6

and only five of the items have means of less than 2.00, and two of these are right at that mark. The three items that are avoided in self-rankings are Is very tense; Conservativeness; and Dismisses the opinions of others. Phrased somewhat differently, what is interesting about these data is the fact that persons are inclined to see themselves as having more of almost any characteristic than other people in the post-meeting rankings. The

TABLE 6  
MEANS AND STANDARD DEVIATIONS:  
POST-MEETING MALE  
SELF-RANKING DATA

	Mean	Standard Deviation
1. Shows solidarity and friendliness	2.56	1.04
2. Disagrees often	2.15	1.32
3. Is very active	2.38	1.16
4. Intelligence	2.59	1.06
5. Is very tense	1.76	1.44
6. Directiveness	2.55	1.23
7. Social sensitivity	2.17	1.33
8. Initiative	2.65	1.15
9. Orderliness	2.31	1.37
10. Gets upset easily	1.98	1.48
11. Is very responsive to humor	2.91	1.06
12. Rationality and logic	2.77	1.18
13. Makes others feel he understands them	2.56	1.20
14. Perseverance	2.42	1.22
15. Tends to be very nervous	1.99	1.49
16. Conservativeness	1.80	1.42
17. Tends to be antagonistic	2.06	1.28
18. Trustworthiness	2.62	1.26
19. Independence	2.79	1.22
20. Dismisses the opinion of others	1.85	1.33
21. Makes many suggestions	2.84	1.19
22. Self-reliance	2.80	1.23
23. Emotionality	2.33	1.40
24. Authoritarian	2.25	1.19
25. Likeability	2.09	1.17
26. Responsibility	2.55	1.19
27. Inquisitiveness	2.89	1.26
28. Intensity	2.39	1.26
29. Clearmindedness	2.55	1.15
30. Assertiveness	2.42	1.25
31. Tends to be erratic	2.06	1.27
32. Does most of the talking	2.42	1.12
33. Pays attention to the task	2.72	1.36
34. Interrupts others	2.57	1.22
35. Supports other's suggestions	2.55	1.22
36. Discusses things in personal terms	2.49	1.45
37. Interested in getting things done	2.87	1.25
38. Acuteness	2.41	1.26
39. Rigidity	2.10	1.32
40. Tends to direct when necessary	2.97	1.16

meaning of this in practical terms is of some importance. For example, there have been several reports on the fallacies involved in personal validation of diagnostic descriptions (4, 5). In a review of the points involved in these studies, it appeared that several things could lead to spurious personal validation of personality diagnosis. Those suggested were that vague statements do not communicate the uniqueness of the individual, and, further, that individuals tend to find statements acceptable that are favorably phrased, that are modal (occur for most people), and that are provisional. It seems that another important contributing element may be that persons see the named trait and descriptive phrases more often in themselves than in others. The striking thing about these data is not that only three items are ranked noticeably below the expected mark, but the fact that even for these the rankings are as high as they are. Examining the characteristics that are viewed in the self more often than in others, one will find quite a number of characteristics that are ordinarily thought of as being undesirable. As a matter of fact, there is even some humor in the analysis of the characteristics from this point of view. For example, conservativeness appears to be more of a dirty word in this group than being authoritarian.

#### E. ANALYSIS OF SELF-RATINGS

The section on the analysis of self-rankings involved the post-meeting evaluation of actual performance. In considering the frame of reference of the individual in making assessments of himself and others, it is possible to abstract the consideration from any particular set of others. Thus, in the design of the research for these replications, the subjects were asked in the first test period to rate themselves on a scale from 0 to 9 about how well the 40 descriptive phrases and trait names described them. Under these conditions, a person could give a realistic assessment of himself in terms of the way he perceives his own participation among his peers, but such a self-assessment would also allow him to choose a level at which the ratings are made (elevation), and presumably also to emphasize any unique associations of characteristics that he would see within his own self. Thus, in a sense, the self-assessment form is a more permissive type of response since it does not force the location of the individual among a restricted and particular set of persons, but it is also subject to the usual difficulty in dealing with ratings that the elevation is confounded in the associations.

The self-assessment responses of 180 male subjects were intercorrelated, and the matrix is presented above the diagonal in Table 4. As in the other analyses reported thus far, the Complete Centroid Technique was used to



TABLE 7  
ORTHOGONAL ROTATED FACTORS:  
MALE SELF-ASSESSMENT DATA

	I	II	III	IV	V	VI	VII	VIII	h <sup>2</sup>
1. Shows solidarity and friendliness	37	69	01	-07	-04	06	06	00	63
2. Disagrees often	25	-26	17	11	-03	23	-34	16	37
3. Is very active	58	25	-03	-15	20	24	-26	02	59
4. Intelligence	51	05	40	-09	-12	08	-35	-05	57
5. Is very tense	-23	-16	12	70	-02	09	01	04	59
6. Directiveness	67	-13	01	-09	-09	06	-20	-14	55
7. Social sensitivity	-02	-08	09	39	-35	-16	02	17	34
8. Initiative	73	-03	-08	-09	-10	14	-11	-07	59
9. Orderliness	31	16	05	-11	-14	-11	44	-13	38
10. Gets upset easily	-17	06	-31	46	-12	-01	-13	10	38
11. Is very responsive to humor	28	38	39	-15	-06	06	-06	-12	42
12. Rationality and logic	31	27	48	04	26	-28	-02	-02	55
13. Makes others feel he understands them	34	52	17	07	01	-13	19	07	48
14. Perseverance	57	-07	-12	-01	03	-06	22	-23	45
15. Tends to be very nervous	-27	-24	-17	66	13	-04	00	-06	62
16. Conservativeness	00	-19	-03	09	-16	-18	35	02	23
17. Tends to be antagonistic	01	-43	-03	08	-16	29	00	31	40
18. Trustworthiness	36	25	06	-07	15	-14	16	-08	27
19. Independence	59	-08	16	06	16	04	00	22	46
20. Dismisses the opinion of others	-18	-22	-09	04	-11	26	-11	25	24
21. Makes many suggestions	69	09	00	-06	-02	38	-11	-01	64
22. Self-reliance	66	-02	24	-11	08	02	17	22	59
23. Emotionality	05	17	-12	47	-45	09	-03	-15	50
24. Authoritarian	28	-02	-07	-03	-05	53	09	-03	38
25. Likeability	33	68	09	-13	01	02	-02	05	60
26. Responsibility	66	23	13	-07	-11	-11	39	03	69
27. Inquisitiveness	53	-07	06	-03	-13	11	-30	05	41
28. Intensity	52	-14	09	24	-24	-04	-39	-04	57
29. Clearmindedness	62	11	46	-08	04	-23	07	15	70
30. Assertiveness	72	04	08	01	05	18	-01	-01	56
31. Tends to be erratic	-19	-04	19	36	-05	22	-35	-03	38
32. Does most of the talking	23	07	-02	-06	03	67	-14	-07	54
33. Pays attention to the task	52	06	20	-02	39	-10	05	-15	50
34. Interrupts others	01	-11	16	16	-04	59	-02	06	42
35. Supports other's suggestions	26	26	31	09	-28	-03	06	-05	32
36. Discusses things in personal terms	08	24	09	06	-28	30	04	-04	25
37. Interested in getting things done	50	25	02	-03	22	-14	21	-15	45
38. Acuteness	48	-17	36	09	-09	02	-17	-28	51
39. Rigidity	20	-05	12	20	-03	25	12	-37	31
40. Tends to direct when necessary	61	19	22	01	-03	-08	17	08	50

Note: Decimal points omitted.

TABLE D  
MALE SELF-ASSESSMENT DATA

Variable	Loading
<i>Factor I, Individual Assertiveness</i>	
8. Initiative	.73
30. Assertiveness	.72
21. Makes many suggestions	.69
6. Directiveness	.67
22. Self-reliance	.66
26. Responsibility	.66
29. Clearmindedness	.62
40. Tends to direct when necessary	.61
19. Independence	.59
3. Is very active	.58
14. Perseverance	.57
27. Inquisitiveness	.53
28. Intensity	.52
33. Pays attention to the task	.52
4. Intelligence	.51
37. Interested in getting things done	.50
<i>Factor II, Sociability</i>	
1. Shows solidarity and friendliness	.69
25. Likeability	.68
13. Makes others feel he understands them	.52
17. Tends to be antagonistic	-.43
11. Is very responsive to humor	.38
<i>Factor III, Manifest Intelligence</i>	
12. Rationality and logic	.48
29. Clearmindedness	.46
4. Intelligence	.40
11. Is very responsive to humor	.39
38. Acuteness	.36
35. Supports other's suggestions	.31
10. Gets upset easily	-.31
<i>Factor IV, Manifest Emotionality</i>	
5. Is very tense	.70
15. Tends to be very nervous	.66
23. Emotionality	.47
10. Gets upset easily	.46
7. Social sensitivity	.39
31. Tends to be erratic	.36
<i>Factor V, Task Interest</i>	
23. Emotionality	-.45
33. Pays attention to the task	.39
7. Social sensitivity	-.35
<i>Factor VI, Responsiveness</i>	
32. Does most of the talking	.67
34. Interrupts others	.59
24. Authoritarian	.53
21. Makes many suggestions	.38
36. Discusses things in personal terms	.30

TABLE D (continued)

Variable	Loading
<i>Factor VII</i>	
9. Orderliness	.44
26. Responsibility	.39
28. Intensity	— .39
4. Intelligence	— .35
16. Conservativeness	.35
31. Tends to be erratic	— .35
2. Disagrees often	— .34
27. Inquisitiveness	— .30
<i>Factor VIII</i>	
39. Rigidity	— .37
17. Tends to be antagonistic	.31

*Note:* Loadings below .50 may be examined in the table of orthogonal rotated factors for Factor I, and loadings below .30 for Factors II-VIII.

factor the matrix, and the orthogonal rotated factors are presented in Table 7. The examination of the extracted factors in this case indicated that 8 factors should be retained for rotation.

The first thing to be noted about this analysis is that, although 8 factors were retained instead of the 6 or 7 in the previous analyses, the mean  $h^2$  is .47, while that of the self-rankings was .50, and those of the rankings received were much higher. These lower  $h^2$ s for the self-rankings and the self-assessment form indicate one interpretive problem that cannot be resolved in these data. Clearly, when the ratings of individuals are cumulative, the common content of the frames of reference is distilled and the score is more stable than any single individual score. In comparison of self-rankings and self-assessments, however, there appears to be an equal degree of sharing of the frame of reference indicated by the relatively close mean size of  $h^2$ s for the two matrices. Why the mean size should be so close rather than different, is of speculative interest, since artifacts can be suggested that would contribute to the relative efficiency of each method of getting scores. In the self-ranking, for example, the frame of reference of the individual is presumably contaminated by the vagaries of sampling in the selection of the group members, and this presumably would lead to less reliable results than if the person ranked himself in several groups and a mean score were utilized. In the self-assessment score the individual may be subject in his ratings to tendencies to either generally rate high or generally rate low, and these differences in elevation would contribute to error variance.

In terms of the factor structure, again there is considerable similarity between the self-assessment scores and our previous analyses (Table D).



It should be noted, however, that Factor I, Individual assertiveness, occurs with greater similarity to the post-meeting male data than it does to the post-meeting male self-ranking data. In the self-ranking data, it will be recalled, the primary definition of the first factor was in terms of intelligence variables rather than in terms of assertiveness, although both these were pooled into a single factor. In the post-meeting male data, intelligence items occurred to provide the secondary connotation, with loadings in the neighborhood of .5 and .6. In the self-assessment data a similar arrangement is seen, and the intelligence items occur with loadings in the neighborhood of .5.

Factor II is again Sociability and there is nothing particularly distinguishing about the occurrence in these data, except possibly to note that it is again a minor factor rather than a dominant one like Factor I.

The third factor is the Manifest intelligence factor that was found in the post-meeting analyses and was previously reported in the BCM study. It is again similar to the post-meeting male data where the loadings that occurred were not particularly high but the cluster was reasonably well identified, in contrast to the female data where the identification of the factor appeared to be extremely clear and quite dominant in the analysis.

Factor IV is again Manifest emotionality. The arrangement is the common one of the items Is very tense, Tends to be very nervous, Emotionality, and Gets upset easily. Of some interest is the location of Item 7, Social sensitivity, that occurs in this definition of Manifest emotionality. This item had been added to the list of characteristics in the expectation that it would occur with a meaning of "social intelligence." The item was found to have a very low saturation in the matrix in the male data, and the apparent explanation for this is the dual meaning that can be attributed to social sensitivity; on the one hand being sensitive in terms of one's self, and on the other hand being aware of the social situation and the needs of others.

Factor V has been provisionally identified as Task interest, since the item, Pays most attention to the task, occurs in the definition. The definition, however, is not a clear-cut one and seems to be one of persons paying attention to the task in the absence of Emotionality and Social sensitivity, presumably a detached attitude in wanting to get the task done. The loadings for this factor are small, however, and only three items occur in the definition, so that it is not considered to be well defined.

Factor VI does not seem to directly replicate any other factor thus far reported, and the similarity is greatest to the Factor III in the male self-

ranking data that we have previously called Authoritarian. It should be recognized that the Authoritarian factor exists concomitantly with the Manifest emotionality factor. On the other hand, the additional factor of Tenseness that occurred in the self-ranking data does not occur here and it should be noted that the highest loadings in the current definition of Factor IV, Manifest emotionality, are the common ones of Is very tense and Tends to be very nervous, while in the self-ranking data the primary definition for Factor IV was associated with the items Gets upset easily and Emotionality.

The seventh factor in the self-assessment data appears to be similar to the seventh factor in the self-ranking data. We have again called it Res-ponsibility since this item has one of the primary loadings. The definition, however, should not be interpreted as a clear one, even though there is the joint occurrence of four out of the five variables that occur in the self-ranking data, since the loadings are small.

The eighth factor of these data was defined by only two variables, absence of Rigidity and Tends to be antagonistic. Since the loadings were quite small, it is necessary to rule this as an uninterpretable factor. Thus, in fact, we suggest that seven factors were probably the appropriate number to describe these self-assessment data, rather than the eight that were retained in the rotation.

In the discussion of the self-rankings, it will be recalled there was an indication of the general tendency for persons, when they rank themselves in terms of others in the group, in the direction of viewing themselves as having the quality even though it might be negatively valued in society. In dealing with the self-assessment data, a similar type of interpretation is possible. The form of the response required from the subjects was to indicate on a scale running from 0 to 9 their location when the poles were identified as "Definitely does not describe me" or "Definitely describes me." The means and standard deviations for the responses on the self-assessment form are indicated in Table 8. The mean for all characteristics is 5.78, and the zero point indicated in the response form was at 4.50. This indicates that overall, these characteristics are rated by the respondents as describing them well. Ten of the characteristics have means that are below 4.50, and seven of these are below 4.00. Examination of these indicates that they are the items that have occurred in the "Manifest emotionality" and "Authoritarian" factors. Observing the array of means, again, the really impressive fact is that the means are so high for these negative characteristics rather than that they are below the theoretical zero point.

TABLE 8  
MEANS AND STANDARD DEVIATIONS:  
MALE SELF-ASSESSMENT DATA

	Mean	Standard Deviation
1. Shows solidarity and friendliness	6.70	2.29
2. Disagrees often	4.12	2.46
3. Is very active	6.22	2.26
4. Intelligence	6.97	1.73
5. Is very tense	3.61	2.76
6. Directiveness	5.98	2.20
7. Social sensitivity	5.33	2.81
8. Initiative	6.11	2.31
9. Orderliness	6.13	2.39
10. Gets upset easily	3.83	3.30
11. Is very responsive to humor	7.30	2.15
12. Rationality and logic	7.07	1.81
13. Makes others feel he understands them	7.17	1.92
14. Perseverance	6.14	2.16
15. Tends to be very nervous	3.32	2.89
16. Conservativeness	5.28	2.79
17. Tends to be antagonistic	2.92	2.42
18. Trustworthiness	7.52	1.76
19. Independence	7.15	1.98
20. Dismisses the opinion of others	3.06	2.50
21. Makes many suggestions	6.08	2.24
22. Self-reliance	6.97	2.01
23. Emotionality	4.76	2.70
24. Authoritarian	4.48	2.49
25. Likeability	7.02	1.85
26. Responsibility	7.05	1.88
27. Inquisitiveness	7.20	2.04
28. Intensity	6.25	1.92
29. Clearmindedness	7.08	1.79
30. Assertiveness	6.18	2.16
31. Tends to be erratic	3.87	2.57
32. Does most of the talking	4.66	2.39
33. Pays attention to the task	6.74	1.86
34. Interrupts others	3.83	2.63
35. Supports other's suggestions	6.11	1.66
36. Discusses things in personal terms	5.73	2.46
37. Interested in getting things done	7.47	1.59
38. Acuteness	6.36	2.06
39. Rigidity	4.17	2.47
40. Tends to direct when necessary	7.38	1.94

#### F. A REPLICATION IN JUDGMENTS

In the four replications that have been presented in this report, two have dealt with the way a person is perceived by his fellows, and two have dealt with the self-perceptions of respondents. In comparing these, we have indicated that one of the important factors that underlies the structures found is the common frame of reference. The final replication presented



is one that is more abstracted from individual ratings than the others, namely, it is the judgment of the nature of the characteristics themselves.

Forty male subjects were asked to classify the characteristics into as many categories as necessary in order to group the characteristics into clusters that belonged together. Three of the subjects used only two or three categories; 29 subjects were divided over four, five, and six categories; the remaining 8 subjects used between 6 and 11 categories of classification. This corresponds fairly well with our experience in the factor analyses, where we have found either five, six, or seven factors, the factors beyond the first four generally being more difficult to interpret.

The responses of the 40 subjects were cross-classified, and a matrix of joint responses was generated. A cluster analysis was carried out, using a blind procedure, and the results of the interpretable clusters are indicated in Table 9, which indicates the percent of common classifications of the

TABLE 9  
CLUSTERS RESULTING FROM THE CLASSIFICATION OF ITEMS

Items			Per cent common classification of items within and between clusters				
			I	II	III	IV	V
I	2, 17, 20, 24, 32, 34	Disregard of others, Authoritarian	57.5	35.6	4.7	11.4	5.7
II	5, 7, 10, 15, 23	Emotionality		77.1	2.4	1.9	4.8
III	4, 12, 29, 33, 37	Intelligence (focused)			59.0	33.7	22.0
IV	14, 19, 22	Autonomy				59.2	21.2
V	1, 11, 13, 25, 35	Sociability, Supportiveness					60.8

items within the cluster, and also the common classification between clusters.

The first cluster is made up of items that appear to indicate a definition of Disregard of others, or possibly being Authoritarian. The second cluster is very similar to the Manifest emotionality factor that has occurred in most of our previous matrices. It should be noted that the first two clusters are fairly strongly related in this cluster analysis. The third cluster has been identified here as (focused) Intelligence, and it incorporates items that have a meaning associated with Task interest as well as intelligence. The fourth cluster is identified as Autonomy, and is strongly related to the intelligence cluster. The last cluster that we were able to define in the data corresponds quite directly to our previous experience with a Sociability factor. This cluster is somewhat related to Clusters III and IV.

None of these clusters corresponds directly to the Assertiveness factor that has been the most dominant and pervasive one in all of the factor

analyses reviewed. The single item of Assertiveness is fairly well associated in this matrix with Clusters I, III, and IV. The item Is very active is fairly strongly related to Clusters III, IV, and V. This supports the suggestion that activity, or possibly better noticeability, is not a part of the frame of reference of judging qualities, but it enters in an important way in the judging of persons.

Comparing the results of the cluster analysis of judgments with the factor analyses reported above, at least partial replication is indicated. There is a Sociability cluster, an Intelligence cluster, and an Emotionality cluster. Further, there is an Authoritarian cluster that corresponds to one of the minor factors that occurred in two of the matrices. The Autonomy cluster found is highly related to the Intelligence cluster. The Task interest factor, which is at best poorly defined in the reported factor analyses, does not occur and the items that normally occur defining this factor occur as part of the Intelligence cluster.

#### G. CONCLUSION

This report has presented five replications designed to shed light on the general nature of behavioral characteristics as they occur in ratings and rankings. Two of the analyses were of the characteristics of persons as perceived in the consensus of group members. These permitted a comparison of male and female subjects. A third replication examined the self-rankings the members made within the context of ranking the total group. The fourth replication involved the ratings essentially allowing the members an opportunity to not only indicate how they ordered the various qualities, but also to introduce a more abstract frame of reference and the freedom of choosing the level for the ratings. The fifth replication represents the most abstract consideration of the characteristics, being an analysis of the ways the characteristics themselves are judged to belong together.

The results of these replications suggest that in the evaluation of behavioral characteristics of persons, four factors appear to recur fairly consistently, Individual assertiveness, Sociability, Intelligence, and Emotionality. Other factors that are not as consistent or as unilaterally interpretable occur. The structural arrangement of the factors is altered depending on the circumstances of the replication. In terms of judging qualities as compared to characteristics of judging persons, the frame of reference involved appears to be different with noticeability implicitly

partialled out, but the organization of the other characteristics involved seems to be similar.

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## DIFFERENCES IN PERCEPTION OF THE OPPOSITE SEX BY MALES AND FEMALES\*

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### A. PROBLEM

It has been experimentally established "... that the attitudes characteristic of different groups within a society tend to produce measurable differences in the perceptions and memories of the individuals who belong to them. Thus, whether a person is white or colored, rich or poor, Democrat or Republican, communist or anticommunist, religious or atheistic, tends in some measure to affect—to alter or even to distort—his perception and memory of objects and events in the world about him" (3, p. 403). The present study is an investigation of differences in perception of the opposite sex by male and female college students as revealed by their completions of incomplete sentences relating to the opposite sex.

Formulation of specific hypotheses was somewhat limited by lack of experimentation in this area, but the general hypothesis was made that among young, unmarried adults, females perceive males more favorably than males perceive females. This hypothesis was based upon two assumptions. First, the androcentric bias (7) was assumed to be operating among the college populations tested. The androcentric bias is "... the age-long theory of feminine inferiority proclaimed by man from time immemorial and seemingly accepted by the so-called really feminine women" (7, p. 262). Second, since value and need have been shown to magnify and enhance the perception of objects (1, 2), the assumption was made that in the United States, where spinsterhood is generally regarded as tantamount to failure, but bachelorhood carries no social stigma, marriageable females regard males as more valued and needed than marriageable males regard females.

### B. METHOD

Subjects were 90 male college students in a small, denominational men's college and 125 female college students in a small women's college of the same denomination. Ss were ignorant of the purpose of the experiment,

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key sentence completion items being embeded in what was presented by each of three instructors to their regular psychology classes as "a sentence completion test of personality." The four key items, as well as some of the "filler" items, were from the Sacks Sentence Completion Test (6, pp. 377-378). The key items are given in Table 1.

TABLE 1

Male subjects	Female subjects
1. I believe most women . . .	1. I believe most men . . .
2. I think most girls . . .	2. I think most boys . . .
3. My idea of a perfect woman . . .	3. My idea of a perfect man . . .
4. What I like least about women . . .	4. What I like least about men . . .

Each sentence completion was placed on a separate card and types of male and female completions were categorized for each of the four items. Four judges<sup>1</sup> collaborated on the formation of the categories. Using a miscellaneous category for the relatively few responses of a unique type, it was possible to categorize the completions for each sentence into 10 categories. The nature of the categories varied between items and, to a lesser extent, within items for the two sexes. It was found that rank-difference correlations between male and female responses could be calculated for the majority of the categories for Items 3 and 4.

### C. RESULTS

Results for males and females in terms of proportions of types of sentence completions for each of the four items are presented in Tables 2 through 5. Tables 2 and 3 reveal that college females perceive males more favorably than college males perceive females, the differences for both Items 1 and 2 being significant at better than the .01 level. For college males, proportions of favorable sentence completions are strikingly similar for Item 1 ( $p = .435$ ) and Item 2 ( $p = .445$ ), which refer to women and girls, respectively. For college females, a larger proportion of favorable sentence completions was made for Item 1, which refers to men ( $p = .855$ ) than for Item 2, which refers to boys ( $p = .695$ ).

The most striking fact revealed by Tables 4 and 5 is the lack of agreement between males and females as to desirable and undesirable characteristics of the opposite sex. Rank-difference correlations between the seven categories which could be paired in Table 4 and the six categories which could be paired in Table 5 were insignificant (see Tables 4 and 5).

<sup>1</sup> Appreciation is expressed to R. W. Gilbert, J. H. Reynolds, and W. T. Teachey, who assisted the author in formation of the categories.

TABLE 2

PROPORTIONS OF TYPES OF SENTENCE COMPLETIONS BY MALES TO "I BELIEVE MOST WOMEN" AND BY FEMALES TO "I BELIEVE MOST MEN"

No.	Males Category Type of completion	$p$	No.	Females Category Type of completion	$p$
1.	Are beautiful or good	.22	1.	Are nice or intelligent	.42
2.	Seek marriage and its consequent security	.18	2.	Are ambitious	.17
3.	Are inferior to men	.13	3.	Are interested in the opposite sex	.12
4.	Are equal to men	.11	4.	Are normal	.07
5.	Are happiest as wives and mothers	.07	5.	Are immature or inconsiderate	.06
6.	Are self-centered	.07	6.	Are conceited	.05
7.	Are shallow or silly	.07	7.	Have high ideals	.04
8.	Talk too much or gossip	.06	8.	Are deceitful	.02
9.	Are extravagant	.02	9.	Are honest or fair	.02
10.	Miscellaneous	.07	10.	Miscellaneous	.03

Note.—Male Categories 1, 4, and 5 were classified as favorable, as were female Categories 1, 2, 3, 4, 7, and 9. All other categories were classified as unfavorable except No. 10, which was split evenly between unfavorable and favorable. The difference between proportions of favorable sentence completions for males ( $p = .435$ ) and females ( $p = .855$ ) was significant at better than the .01 level,  $z$  being 6.36.

TABLE 3

PROPORTIONS OF TYPES OF SENTENCE COMPLETIONS BY MALES TO "I THINK MOST GIRLS" AND BY FEMALES TO "I THINK MOST BOYS"

No.	Males Category Type of completion	$p$	No.	Females Category Type of completion	$p$
1.	Are nice company or good to have around	.34	1.	Are nice or wonderful	.50
2.	Are shallow or silly	.20	2.	Are immature	.13
3.	Are marriage-minded	.12	3.	Are inconsiderate	.08
4.	Are mixed up or crazy	.08	4.	Are considerate	.07
5.	Are conceited	.06	5.	Are ambitious	.06
6.	Are attractive or sexy	.05	6.	Are conceited	.05
7.	Are less intelligent or able than men	.04	7.	Are alike or similar	.03
8.	Are cold or indifferent	.02	8.	Like sports	.03
9.	Are sensible or honest	.02	9.	Are human beings	.02
10.	Miscellaneous	.07	10.	Miscellaneous	.03

Note.—Male Categories 1, 6, and 9 were classified as favorable, as were female Categories 1, 4, 5, 8, and 9. All other categories were classified as unfavorable except No. 10, which was split evenly between unfavorable and favorable. The difference between proportions of favorable sentence completions for males ( $p = .445$ ) and females ( $p = .695$ ) was significant at better than the .01 level,  $z$  being 3.57.



TABLE 4  
PROPORTIONS OF TYPES OF SENTENCE COMPLETIONS BY MALES TO "MY IDEA OF A PERFECT WOMAN" AND BY FEMALES TO "MY IDEA OF A PERFECT MAN"

No.	Males Category Type of completion	<i>p</i>	No.	Females Category Type of completion	<i>p</i>
1.	Is beautiful	.18	1.	Is considerate (4)	.29
2.	Is my girlfriend	.17	2.	Has a good character (6)	.26
3.	Doesn't exist	.17	3.	Is my boyfriend (2)	.18
4.	Is loving or understanding	.12	4.	Is mature or stable	.06
5.	Is intelligent	.10	5.	Is a family man or a good provider (7)	.06
6.	Has a good character	.09	6.	Is tall or handsome (1)	.05
7.	Is my mother or similar to my mother	.06	7.	Is intelligent (5)	.03
8.	Is congenial	.04	8.	Doesn't exist (3)	.02
9.	Is a certain movie star	.03	9.	Is rich	.02
10.	Miscellaneous	.04	10.	Miscellaneous	.03

*Note.*—Each number in parentheses following a female type of completion designates the number of the male category with which it was paired for calculation of a rank-difference coefficient of correlation, which is  $-.21$ .

TABLE 5  
PROPORTIONS OF TYPES OF SENTENCE COMPLETIONS BY MALES TO "WHAT I LIKE LEAST ABOUT WOMEN" AND BY FEMALES TO "WHAT I LIKE LEAST ABOUT MEN"

No.	Males Category Type of completion	<i>p</i>	No.	Females Category Type of completion	<i>p</i>
1.	Deceitfulness or insincerity	.23	1.	Egoism or feeling of superiority (6)	.36
2.	Shallowiness or silliness	.22	2.	Inconsiderateness (3)	.14
3.	Lack of dependability	.11	3.	Immaturity (2)	.13
4.	Talking too much	.10	4.	Crudeness or vulgarity (8)	.10
5.	Concern with appearance	.08	5.	Insincerity (1)	.04
6.	Self-centeredness	.06	6.	Stubbornness or sternness	.03
7.	Nothing to dislike	.06	7.	Aggressiveness	.03
8.	Use of foul language	.04	8.	Lack of understanding	.03
9.	Apathy or lack of ambition	.02	9.	Nothing comes to mind (7)	.03
10.	Miscellaneous	.08	10.	Miscellaneous	.04

*Note.*—Each number in parentheses following a female type of completion designates the number of the male category with which it was paired for calculation of a rank-difference coefficient of correlation, which is  $.07$ .

#### D. DISCUSSION

Present results definitely confirm the hypothesis that among young, unmarried adults, females perceive males more favorably than males perceive females. This is probably due not only to androcentric bias (7) on the part of males (and possibly some females), but also to enhancement of the female's perception of the male by the fact that he is relatively more needed

and valued by her as a marriage partner. In the United States, marriage for women is both a security and a prestige goal, neither of which is ordinarily true for men. In fact, marriage for men usually involves assumption of financial responsibility and loss of cherished personal freedom. The male's feelings about marriage are to some extent reflected in the popular expressions which describe marriage as the "catching" or "trapping" of a man by a woman. The fact that sexual drive or need is stronger in the male than the female (4, 5) might be expected to enhance the male's perception of the female more than the female's of the male. According to the present results, however, enhancement of the male's perception by this need is counteracted by androcentric bias and threat of marriage. Evidence that threat of marriage "de-enhances" the male's perception of the female is seen in Table 2, in which the completion "I think most women seek marriage and its consequent security" ranks second, and in Table 3, in which the completion "I think most girls are marriage-minded" ranks third.

The lack of correspondence between desirable and undesirable traits in the opposite sex reveals one source of tension and disagreement between the sexes. A difference in goals is shown in Table 4, where physical attractiveness ranks first for males and sixth for females, considerateness or understanding ranks first for females and fourth for males, and good character ranks second for females and sixth for males. Much the same picture is revealed in Table 5, with insincerity ranking first for males and fifth for females, and egoism first for females and sixth for males. Thus, sentence completions to Items 3 and 4 reveal a marked difference between male and female perceptions of desirable and undesirable traits in the opposite sex.

#### E. SUMMARY

Four sentence completion items concerning the opposite sex were administered along with other incomplete sentences to 90 male and 125 female college students. Types of sentence completions for each of the four items were categorized for males and females and proportions of completions falling within each category determined. It was found that among young, unmarried adults, females perceive males significantly more favorably than males perceive females. This was interpreted as being due to androcentric bias, and to enhancement of the female's perception of the male by the fact that he is relatively more needed and valued by her as a marriage partner.

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## ATTITUDES IN DISCRIMINATION LEARNING\*

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### A. INTRODUCTION

Attitude studies have traditionally been naturalistic in approach, dealing with established attitudes toward such common objects as racial and nationality groups. The purpose of such studies has usually been to show relationships between strength of attitude and age, various aspects of personality, personal history, group norms, and other attitudes. Recently, experimental methods have been used in studying attitude change through persuasion or group pressures. Over a longer period of time, a number of experiments have been performed on the effects of attitudes upon learning and reasoning with controversial materials, but there have been few concerning the manifestation of attitudes in actual choice behavior. In view of the complexity of attitudes and the vagueness of attitude theories, it would seem that the experimental study of relatively simple attitudes under known conditions of acquisition and expression would lead to a clearer understanding of the nature of attitudes.

This view evidently underlay the theorizing of Doob (1) and led to Eisman's (3) experimental study of object choice behavior based upon known conditions of learning and generalization. Eisman showed that differentially rewarding the choice of objects according to their nonsense names—thereby inducing a positive attitude toward the class of objects called by the rewarded name—biased the choice among objects with distinct colors which had previously been associated with the nonsense names. This bias also generalized to characters in a story who were identified verbally by color. Eisman used reward to develop an attitude which was demonstrated in a single trial, but neglected problems of facilitation or interference in longer range effects.

Duncker (2) verbally associated a strange but distinctive food with a hero for his juvenile Ss. He demonstrated that the resultant induced pre-

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ference for the food survived three extinction trials based on experiencing a disagreeable taste with the food, the preference weakening with each trial. However, he did not compound attitude and reward, nor did he gather data concerning generality.

The present study deals with effects of experimentally induced attitudes on objects of choice during several phases of discrimination learning where choosing a given object may be rewarded and where a choice can also be made among alternatives to such a rewarded object. Attitude is conceptualized as a basis for valuing relevant objects which is general rather than specifically including or excluding certain uses of those objects. It is assumed that attitudinal value and reward value are additive in the production of selective tendencies toward objects. It is further assumed that meaningful associations among objects of choice produce a spread of attitudinal effect from one to another. These assumptions, together with accepted principles of associative learning, lead to the following specific hypotheses:

1. Learning to select a particular object is facilitated by a pre-learning attitude toward the object consistent with its actual reward value, and is inhibited by a pre-learning attitude inconsistent with its actual reward value.
2. *With learning constant*, persistence during extinction in the selection of an object consistently rewarded during learning is a function of the attitude toward the object prior to reward learning.
3. When the selective tendency favoring an attitudinal object is partially extinguished, choices among alternatives will favor objects closely and positively related to that object in the attitude system.
4. When a set for general evaluation of objects is salient, the tendency to select a positively valued object is greater than when such a basis is less salient.

## B. METHOD

### 1. *Learning Task*

The objects of selection were three geometric symbols: a large triangle, a smaller triangle, and a circle, hereafter referred to as *T*, *t*, and *c*, respectively. These symbols were chosen to correspond to the three similar symbols in the attitude-inducing device, a movie produced by Heider and Simmel (4) and described below. The three symbols were displayed simultaneously on separate cards in a box placed on the table or chair-arm of each *S*. Symbol cards were selected one at a time until one was chosen which had a reward sign—a red X—on its back. A fresh display constituting Trial 2 was then presented in the box and symbols were chosen until the reward sign again

appeared. Each display actually contained three stacks of symbol cards—one stack of *T*'s, one of *t*'s, and one of *c*'s. Each stack contained eight cards, and the reward was always on the back of the second card from the top of the *t* stack or the *T* stack, depending upon experimental condition and phase of training. The left-center-right position of symbols in successive displays and for different boxes was varied in a quasi-random counter-balanced order so as to make position habits equally inefficient in all experimental conditions. Each symbol choice was automatically registered, and each *S* could proceed at his own speed through the eight displays in his box.

## 2. *Subjects and Experimental Design*

*S*s were 321 undergraduates enrolled in elementary psychology courses at the Universities of Minnesota and Massachusetts. From 16 to 26 *S*s were assembled at a time in classrooms for a 45-minute experimental session. Each *S* was assigned to one of the 12 experimental groups. The sequence of conditions for Group *A* was (a) being given a set for general (moral) evaluation of objects, (b) being exposed to the attitude-inducing movie, and (c) proceeding with the learning task. For Group *B* the conditions were (a) movie, (b) making character ratings of the symbols *T*, *t*, and *c*, and (c) learning task. For Group *C* the conditions were (a) making ratings, (b) movie, and (c) learning task. For Group *D* the conditions were (a) movie, and (b) learning task. For Group *E* only the making of ratings preceded the learning task, and for Group *F* only the learning task was given. Each of these groups was subdivided so that about half the *S*s were rewarded during the learning task for choosing *t* during Trials 1-4 but not thereafter (*t*+ groups), and the remainder rewarded for choosing *T* during these trials but not thereafter (*T*+ groups). About 60 per cent of *S*s in each condition were males. Groups *A*, *B*, *C*, and *D* may be considered "experimental" groups with respect to the first three hypotheses since each *S* within them was exposed to the attitude-inducing movie. Groups *E* and *F* may be considered "control" groups since attitude induction was omitted for them.

## 3. *Manipulation of Attitude*

The attitude-inducing movie was a one-minute animated cartoon-like melodrama involving *T*, *t*, and *c* as characters. The first 20 per cent of the original Heider and Simmel film was omitted since it tended to increase the ambiguity of the characters. In the film the geometric symbols move human-like in and about a rectangular enclosure, seen in plan view, representing a house. Briefly, the movie opens with *T* attacking *t* while *c* looks on. *t*



strikes back, but is forced to retreat. *T* then enters the house in which *c* had sought safety. As *T* attempts to corner *c*, *t* opens the door of the house and makes *c*'s escape possible. Slamming the door on *T*, *t* and *c* dance and kiss. But *T* emerges and chases the pair about the house. When *t* and *c* escape together, *T* becomes very angry and attacks the house.

By means of this movie it was expected that a positive attitude would be induced in viewers toward *t* and a negative attitude toward *T*. In recall stories written by viewers at the end of the experimental session *t* was frequently referred to as "hero" and *T* as "bully" or "villain."

#### 4. *Symbol Rating Scales*

The success of the attitude-induction technique was checked by requiring some *Ss* (Group *B*) to rate each symbol on 13 dichotomous 7-point character-adjective scales immediately after having seen the movie, and comparing their ratings with those of *Ss* who had not seen the movie at the time the ratings were made (Groups *C* and *E*). The scales and the instructions for their use were modeled after Osgood's semantic differential (6). In the order given, the scales were good-bad, active-passive, clear-unintelligible, strong-weak, helpful-hindering, intelligent-stupid, consistent-inconsistent, leader-follower, trustworthy-untrustworthy, informative-uninformative, purposeful-impulsive, informed-ignorant, and loving-hating. Six of these scales were inverted to discourage halo tendencies.

An over-all valuation score on each symbol for each *S* was determined by adding the 13 ratings. Groups *C* and *E*, which had not been exposed to the movie, gave mean over-all ratings of 3.06, 3.25, and 2.98 to *t*, *c*, and *T* respectively (where 1.00 is the "best" possible rating—closest to the left end of the uninverted scale—4.00 is the neutral point, and 7.00 is the "worst" possible rating). The *c-t* and *c-T* differences are each significant by critical ratio at the .01 level while the *t-T* difference is not significant. In contrast, movie-exposed Group *B* gave mean over-all ratings of 3.21, 3.62, and 3.91 to *t*, *c*, and *T* respectively. The *t-T* difference is significant beyond the .001 level, the *t-c* difference at the .01 level, and the *c-T* difference at the .07 level. The smallest of the inter-symbol mean differences among these movie-exposed *Ss* was greater than the largest among the non-exposed *Ss*. The order of over-all valuation was *t*, *c*, *T*, as expected.

Ratings on the good-bad scale alone indicated that a general evaluative judgment contributed strongly to the resultant induced attitude. Considering differences between Group *B* and Groups *C* and *E*, *t* "gained" 1.06 mean scale points through the movie showing, *c* "gained" 0.41, and *T* "lost" 1.96.

Differences in ratings by female and male *Ss* were negligible. It should be noted that mean ratings of *T* on the 13 separate scales by Group *B* ranged more widely than those of *t* or *c*. *T*'s mean ratings ranged from 1.43 (strong-weak) to 5.65 (good-bad), while mean ratings for *t* ranged from 2.54 (good-bad) to 4.57 (strong-weak), and for *c* from 2.67 (good-bad) to 5.48 (strong-weak). Ranges in Groups *C* and *E* smaller and less disparate.

Further information concerning the symbol valuational effects of the movie came from answers to the question, asked at the end of the experimental session, "If you could be an actor in this movie, which role would you most like to play?" Responses among movie-exposed male *Ss* were *t*, 59 per cent; *c*, 16 per cent; and *T*, 25 per cent. Among female *Ss*, responses were *t*, 41 per cent; *c*, 39 per cent; and *T*, 20 per cent. The preferential order for all *Ss* combined was *t*, *c*, *T*.

### 5. Procedure

The procedure for all groups began with instructions for the discrimination task described above. *Ss* were told that "the object of this task is to find the card with the X [reward sign] using as few cards as you can. That is, try to determine where the X-card is before you draw a card. The fewer cards you draw in the process of finding the one with the little red X on the back, the better will be your score on this task."

For Group *A* the movie was introduced with the following statement, read aloud twice, to make salient a general evaluative basis for valuing symbols:

I am going to show you a movie in which there are three geometric figures—a large triangle, a small triangle, and a circle, moving in various ways in and around a larger square. Imagine that the two triangles and the circle are people acting out a story.<sup>2</sup> As the story is being acted out in the movie, decide how GOOD or how BAD each of these three characters is. That is, pay attention to the MORAL qualities of the three figures.

Groups *B*, *C*, and *D* were shown the movie with instructions only to watch it carefully and keep it in mind during the rest of the experiment.

Upon completion of the learning task each *S* was given a sheet on which to write out from memory a description of the movie story. At the bottom of this sheet *S* was asked to indicate which role in the movie he would most like to play. *Ss* in Group *A* were also asked to recall the symbol which they chose first and to say why they made this choice.

<sup>2</sup> The first two sentences of these instructions were taken verbatim from Shor (8).

## C. RESULTS

Figures 1 and 2 show learning curves in terms of errorless trials for all groups from the first trial of the learning task to the point in the series at which a change in the reward system was evidenced for each *S*. This point cannot be earlier than the completion of the *second symbol choice* in

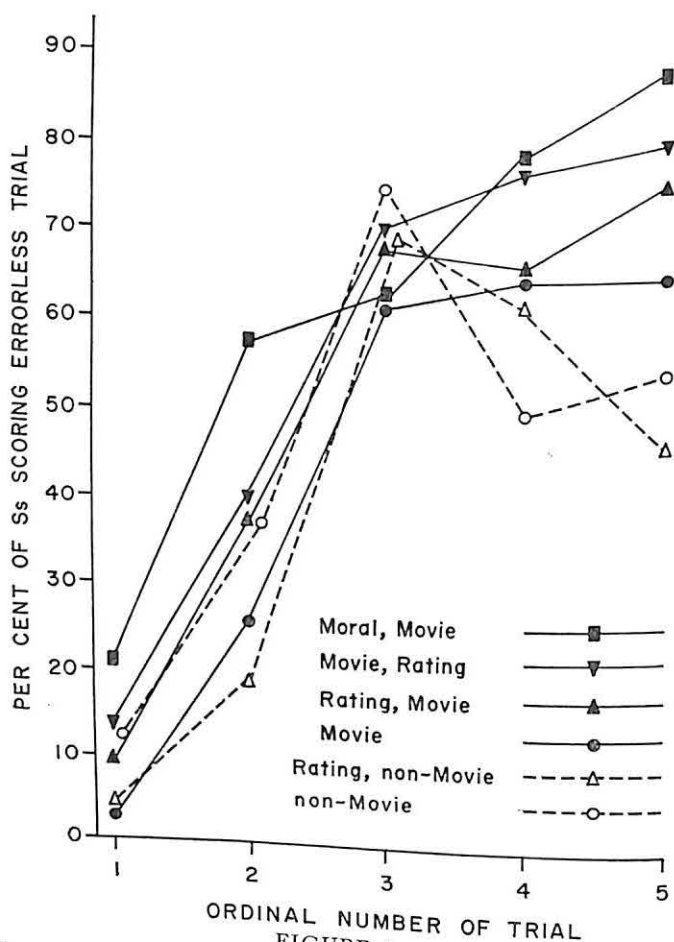


FIGURE 1  
LEARNING CURVES OF *t+* GROUPS—REWARDED FOR CHOOSING THE SMALL TRIANGLE  
("HERO" SYMBOL)

*Trial 5* since the first choice in any trial is never rewarded. Up to this point *Ss* in *t*-rewarded (*t+*) groups scored an errorless trial if they chose two successive *ts* and nothing else on that trial. For *T*-rewarded (*T+*) groups the drawing of two successive *Ts* only constituted an errorless trial.



## 1. Hypothesis 1: Learning

By this hypothesis the movie which was shown to Groups *A*, *B*, *C*, and *D* was expected to *facilitate* learning relative to control Groups *E* and *F* when *t*, the "hero" symbol of the movie, is rewarded. It was expected to *inhibit* learning when *T*, the "villain" symbol, is rewarded.

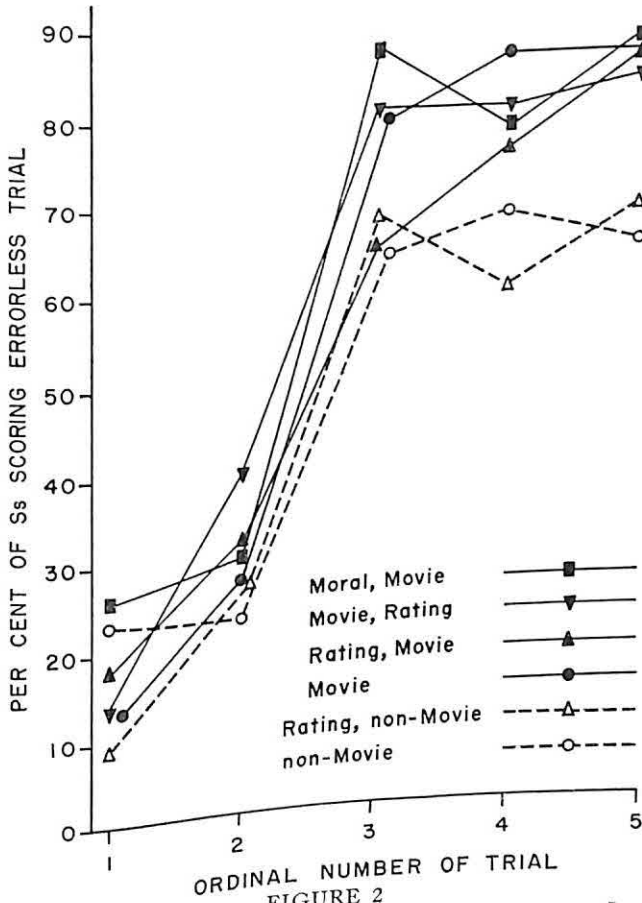


FIGURE 2  
LEARNING CURVES OF *T*+ GROUPS—REWARDED FOR CHOOSING THE LARGE TRIANGLE  
("VILLAIN" SYMBOL)

Mean errorless trials during Trials 1-5 are shown for all groups in Table 1. During this phase of learning groups *At*+ and *BCt*+ chose the rewarding symbol *t* more consistently than groups *Ft*+ and *Et*+, their respective non-attitude-induced controls. The differences in mean errorless trials were

significant at the .05 level by  $t$  test and consistent with the learning-facilitation hypothesis.

Group  $Dt+$  was slightly inhibited by the attitude-inducing treatment, though the  $D-F$  difference is very small and not significant. It should be noted that group  $Dt+$ 's errorless trial distribution was unusually bimodal, with 32 per cent of the cases scoring zero errorless trials while 61 per cent scored 3 to 5 errorless trials.

TABLE 1  
MEAN ERRORLESS TRIALS DURING LEARNING

		Movie-exposed groups			Non-movie groups	
		A	BC <sup>a</sup>	D	E	F
$t+$	Mean	3.13	2.69	2.19	2.00	2.25
	SD	1.42	1.40	1.64	1.39	1.53
$T+$	Mean	3.13	2.86	2.93	2.32	2.41
	SD	1.26	1.35	1.20	1.52	1.50

<sup>a</sup> Groups  $B$  and  $C$  are combined in reporting results since they were both exposed to the character rating scales before the learning task and since their performances on this task were practically indistinguishable.

For this reward-consistent-with-attitude aspect of Hypothesis 1, an over-all test is provided by pooling scores of all attitude-induced  $S$ s and comparing their mean with the mean of pooled scores on non-attitude-induced  $S$ s. Mean errorless trials for  $ABCDt+$  was 2.65, while for  $EFT+$  the mean was 2.12. The difference is significant at the .05 level by  $t$  test.

Results for  $T+$  groups were not consistent with this hypothesis. It was expected that the movie would induce avoidance tendencies with respect to  $T$  and thereby reduce discrimination learning efficiency when  $T$  is rewarded. Table 1 shows that Groups  $AT+$ ,  $BCT+$ , and  $DT+$  each excelled their respective  $T+$  controls. Differences for  $A$  and  $BC$  groups were smaller than in the  $t+$  condition and none were significant at the .05 level.

Pooling scores for an over-all test of this reward-inconsistent-with-attitude aspect of Hypothesis 1, mean errorless trials for  $ABCDT+$  was 2.94 and for  $EFT+$  was 2.36. This difference is significant at the .02 level and contrary to the hypothesis.

Analysis of variance reflected the movie effect but failed to reveal significant movie  $\times$  reward or movie  $\times$  reward  $\times$  character rating interactions in accounting for variation in all errorless trial scores.

## 2. Hypothesis 2: Persistence

For evaluation of object-selection persistence during extinction in attitude-induced and attitude-non-induced  $S$ s, results were tabulated only for  $S$ s

who had an errorless Trial 5 up to the third choice in that trial. That is, "persistence" in selecting an object in any series of choices, e. g., Trial 5, can characterize only those Ss who are approaching that object to begin with. In every previous trial the reward (the red X) came immediately after choosing the second  $t$  (in  $t+$  groups) or  $T$  (in  $T+$  groups). On Trial 5 the reward value of this symbol was disconfirmed by the non-occurrence of reward after the second choice of that symbol. Therefore Ss who went on to one or more additional consecutive draws of that symbol were designated "persisters," while those who switched immediately to another symbol were designated "non-persisters." To insure that group differences in persistence would not be attributable to differences in learning, the distribution of errorless trial scores during Trials 1-4 for movie and non-movie Ss who met the "errorless Trial 5" criterion were compared. In each category of learning efficiency—0, 1, 2, 3, and 4 of Trials 1-4 errorlessly performed—the proportion of movie-exposed Ss so closely matches the proportion of non-movie Ss that a mutual fit as good or better would occur by chance in fewer than 5 samplings in 100. (Chi square is 0.66 which at 4  $df$  is very small:  $.95 < p < .98$ .)

By Hypothesis 2, attitude-induced (movie) groups which had been rewarded for choosing  $t$  during the learning trials were expected to persist *more* than non-movie groups in choosing that symbol during extinction. On the other hand, movie groups which had been rewarded for choosing  $T$  during the learning trials were expected to persist *less* than non-movie groups during extinction.

Among all 89  $t+$  movie-exposed Ss who met the "errorless Trial 5" criterion 70 per cent persisted. Fifty-six per cent of the 25 corresponding non-movie Ss persisted. The corresponding percentages for  $T+$  Ss were 75 and 72. Although a greater proportion of attitude-induced than attitude- and non-induced Ss did persist, neither difference is significant by chi square.

### 3. Hypothesis 3: Inter-Object Relations

This hypothesis stated that "when the selective tendency favoring an attitudinal object is partially extinguished, choices among alternatives will favor objects closely and positively related to that object in the attitude system." Of the 89  $t+$  movie-exposed Ss who met the "errorless Trial 5" criterion, 75 per cent switched to  $c$  as the first alternative choice after abandoning  $t$  on Trial 5. The other 25 per cent of course switched to  $T$ . Among the 25 corresponding non-movie Ss, 52 per cent switched to  $c$  and 48 per cent switched to  $T$ . Chi square is 4.01 which at 1  $df$  is significant at



the .05 level. The reward-consistent-with-attitude aspect of Hypothesis 3 is thus supported by these over-all data, since  $c$  was "closely and positively related to [the reward] object."<sup>3</sup> Comparisons of performances of separate Groups A-F, BC-E, and D-F are in the predicted direction but none alone reaches the .05 level of significance.

Ss in  $T+$  groups could choose either  $t$  or  $c$  after abandoning  $T$  in Trial 5. Neither of these was "closely and positively" related to  $T$ .  $t$ , however, was rated higher than  $c$  on the character ratings. On this basis  $T+$  movie-exposed Ss might be expected to favor  $t$  as an alternative choice. This tendency would be over and above a selective tendency based upon geometric stimulus generalization which would also be a factor in non-movie groups.

Among the 95  $T+$  movie-exposed Ss who met the "errorless Trial 5" criterion, 47 per cent chose  $t$  as their first alternative choice on Trial 5 after abandoning  $T$ . Of the 29 corresponding non-movie Ss, 31 per cent switched to  $t$ . Chi square is 1.79 which at 1  $df$  is not significant at an acceptable level.

#### 4. Hypothesis 4: General Evaluative Set

This hypothesis stated that "when a set for general evaluation of objects is salient, the tendency to select a positively valued object is greater than when such a basis is less salient." A general evaluative basis for valuing  $t$ ,  $T$ , and  $c$  was made salient for Group A by instructing these Ss to attend to "good" and "bad" qualities in the three movie figures. For Groups B and C some lesser degree of salience of moral discriminanda would reasonably be produced by requiring Ss to character-rate the three figures. For Group D no general evaluative set was specially induced, so salience was expected to be least here.

The first opportunity which Ss had to "approach" the most positively valued object  $t$  was the initial choice of Trial 1. Table 2 shows the proportion of each group which chose  $t$ ,  $T$ , or  $c$  at the outset of Trial 1. Although the proportions choosing  $t$  in all groups were small, the proportions increase from Group D to B and C to A, as expected. Entering the corresponding frequencies choosing  $t$  and non- $t$  into a  $3 \times 2$  table, chi square

<sup>3</sup> This assumption concerning  $c$  and  $t$  was validated by analysis of movie descriptions written by Ss at the end of the experimental session. Five judges classified the 180 descriptions according to whether the predominant theme implied that " $t$  and  $c$  are an agreeable pair or social unit, distinct from  $T$ " or that each of the triangles is playing the role of "competitor" in "trying to get  $c$  for himself." Thirty-one descriptions were not classifiable. Of the remaining 149, 85 per cent were classified as " $t$  and  $c$  are an agreeable pair."

TABLE 2  
DISTRIBUTION OF INITIAL SYMBOL CHOICES AT THE OUTSET OF TRIAL 1

Symbol		Movie-exposed groups				Non-movie groups	
		A	B	C	D	E	F
<i>t</i>	Frequency	16	13	17	6	13	15
	Proportion	.34	.22	.28	.10	.27	.33
<i>c</i>	Frequency	9	21	19	36	22	16
	Proportion	.19	.35	.32	.60	.46	.35
<i>T</i>	Frequency	22	26	24	18	13	15
	Proportion	.47	.43	.40	.30	.27	.33
Totals	Frequency	47	60	60	60	48	46
	Proportion	1.00	1.00	1.00	1.00	1.00	1.01

is 9.26 which at 2 *df* is significant at the .01 level. Later phases of the learning series did not yield reliable salience-linked differences.

#### D. DISCUSSION

Regarding behavior toward a reward-yielding, *positively* valued object (*t*), bias in its favor has been satisfactorily demonstrated in the learning phase, unreliably indicated in the persistence phase, and satisfactorily demonstrated in the alternative choice phase of the discrimination series. Regarding behavior toward a reward-yielding but *negatively* valued object (*T*), in no phase was it actually avoided, and in the learning phase it was actually preferred relative to the preference of *Ss* for whom this object had no attitudinal meaning. Regarding behavior in the pre-reward phase, tendency to choose the most positively valued object varied with salience of moral valuational cues.

But despite the relatively high character rating received by *t* and despite the popularity of *t* as a desirable role to play, *t* was the least chosen and *T* the most chosen of the figures in the *initial choice* situation by movie-exposed *Ss*. It will be noted in Table 2 that Group *D*, which lacked objective cues for a character evaluating set, strongly preferred *c*, while Group *A*—oriented toward character evaluation—chose *c* least among all groups. There is evidence that non-attitudinal factors influenced initial choices, in particular the simple sequence of entries by movie figures into the "house" (the order was *c*, *T*, and finally *t*). Lacking a character-evaluative set, and anticipating having to make some differential choice among these figures after seeing the movie, *Ss* in Group *D* were more likely to note a discrete ordering of figures such as order of entry. In fact a greater proportion of *Ss* in Group *D* mentioned priority of entry in their post-experimental movie-recall stories

than *Ss* in other groups. Also it was found that those Group *D* *Ss* whose stories were low in plot detail (below the median in citations of *t*, *c*, and/or *T*) overchose *c* and underchose *t*. The distributions of *t*, *c*, and *T* initial choosing in high-and low-detail *Ss* in Group *D* differed by chi square at a level between .05 and .01. Lack of plot detail in stories could plausibly be a function of attention to mechanical details of the movie which were irrelevant to the plot and its valuational implications.

Contrary to expectations, the choosing of *T*—in the initial choice and during *T*-rewarded discrimination training—was facilitated by exposure to the movie. Introspections collected from Group *A* concerning bases of initial choice indicated that *T* was frequently chosen because "he" was "dominant" in the movie. This basis for choosing would conflict with the evaluative basis unless attention were focussed upon characteristics in which *T* excelled *t*. The three characteristics in which post-movie ratings of *T* exceeded those of *t* were "strong," "active," and "leader." These extremely rated "positive" attributes taken together with extremely rated "negative" attributes of *T* such as "bad," "hating," "hindering," and "untrustworthy" make *T* a more ambivalent character than *t*, whose over-all rating exceeded *T*'s but whose range of mean rated characteristics was much narrower. Exposure to the movie facilitated learning in the *T*+ condition possibly because the reward served to confirm at least the "positive" attributes of *T*, which were unknown to non-movie *Ss*. An unambiguously "negative" attitude toward some object might still, presumably, produce interference in discrimination learning where choosing that object is rewarded.

The results of this study indicate that the expectation of reward for selecting or "approaching" positive attitudinal objects is highly generalized. But the results cast doubt on the simple notion that a negative attitude toward an object interferes with development of an association between that object and positive consequences for selecting that object. In this respect the findings of the present study are consistent with those of Postman and Murphy (7). They showed that attitudes influence the learning of word pairs where both the cue member and the response member of each pair is an attitude-related word. However, they found that learning was facilitated by both compatible attitudinal associations (both words strongly positive or both words strongly negative) and incompatible attitudinal associations (one word strongly positive and the other strongly negative).

The results of the present study are also consistent with the findings of Jones and Aneshansel (5) whose prejudiced *Ss* learned anti-prejudicial statements under certain conditions faster than unprejudiced *Ss*. The pres-



ent study suggests that object ambivalence may be such a condition, facilitating the formation of object-positive value associations for objects with some or even many negative attributes. This is not inconsistent with the findings with respect to an object having many positive attributes, where similar facilitation was noted in various phases of a discrimination learning series. In general it appears that attitude can more usefully be conceived of as susceptibility to certain perceptual and response sets than as an undifferentiated approach or avoidance set.

### E. SUMMARY

It was postulated that a positive attitude toward an object would facilitate learning discriminatively to select that object and would similarly bias selective behavior during and after extinction. It was further postulated that a relatively negative attitude would inhibit such selective behaviors. Attitudes toward three geometric figures were induced by showing Ss a movie in which these figures enacted roles which were differently evaluated. Control Ss were not shown the movie. The same figures then appeared in a symbol discrimination learning task. When the "hero" symbol was rewarded, learning was facilitated by exposure to the movie as was post-extinction favoring of this symbol's companion. When the "villain" symbol was inter-rewarded, learning was also facilitated by the movie. This effect was interpreted in terms of object ambivalence. Salience of general evaluative cues was also shown to influence discriminative choice behavior.

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## THE ROLE OF METAPHORICAL GENERALIZATION AND CONGRUENCY IN THE PERCEPTION OF FACIAL CHARACTERISTICS\*<sup>1</sup>

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### A. PROBLEM

Gradually emerging from various research findings on person perception is the concept that, when required to make judgments from an impoverished stimulus situation, the perceiver responds by "filling in the gaps" according to certain orderly principles (4). As psychologists who make clinical diagnoses are well aware, one rarely has enough information about a person to enable one to make complex judgments with certainty. The individual untrained in the pitfalls of personality appraisal, however, seldom hesitates or lacks confidence in his judgments of people when asked to make evaluations on the basis of the scantiest of information. Of great interest is the process by which he makes these judgments.

Previous research on forming impressions of personality from limited stimulus information (4, 5, 7) suggests that among the important organizing factors are: (a) A tendency to use analogy to bridge the gap from stimulus information to personality judgments. This use of analogy has been termed metaphorical generalization by Secord (4). (b) A tendency on the part of the perceiver to organize stimulus information into a cognitive structure with congruent parts.

Several lines of evidence converge to illustrate the use of analogy in forming impressions of people. Asch (1) has demonstrated that metaphorical terms describing both human characteristics and physical properties of things or events are used in a parallel manner in many languages. In a variety of tongues, persons are referred to as warm or cold, deep or shallow, bright or dull, rigid or elastic. If qualities may apply to things and people, then it is only a short step to the suggestion that qualities inherent in stimulus information may be generalized to personality judgments. For example, a person who has a coarse skin or who uses coarse language may have attributed

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to him lack of sensitivity or a "coarseness" of personality; a person who dresses poorly may be thought of as uncouth.

This use of analogy may well be a rather general property of judgment, for it appears in the judgment of concepts. Osgood, Suci, and Tannenbaum (3) report that judges asked to rate a variety of concepts on a diversity of adjectives produce systematic and orderly ratings, with considerable agreement even on some adjectives which might appear to be unrelated to the concept. Thus, a boulder is not only large and heavy rather than small and light, but it also tends to be strong, loud, and deep rather than weak, soft, and shallow.

The tendency toward congruency may be illustrated by the findings of Asch, Block, and Hertzman (2) who demonstrated that a perceiver presented with a brief trait list describing a person organizes these adjectives into a coherent description involving considerable congruency among the adjectives, which taken as stimulus information may appear to be independent, or even contradictory. Stritch and Secord (7) have also illustrated this principle by showing that the experimental alteration of facial attributes in photographs tends to induce *perceptual* changes in other unchanged facial attributes so as to make the complex of attributes congruent with an organized personality impression.

The present paper attempts to illustrate the process of metaphorical generalization and the tendency toward congruency by demonstrating their effects on the judgments of facial attributes. Most previous studies of impression formation have presented a photograph as stimulus information and asked for personality judgments. By reversing this procedure and asking for judgments of facial characteristics from a personality sketch, the operation of analogical thinking and the tendency toward congruency in judgment may perhaps be more aptly illustrated.

#### B. STATEMENT OF HYPOTHESES

1. Judges presented with contrasting *verbal* descriptions of *personality* and asked to rate the physical characteristics of the persons visualized for each description produce contrasting physiognomic ratings of the persons visualized. In some instances, these physiognomic ratings are derived from the corresponding verbal sketch by a process of analogy.

2. Judges presented simultaneously with photographs of faces and associated verbal *personality* sketches will tend to achieve congruency by rating the physical characteristics of the person in the direction "implied" by the verbal description. Corollary: The photograph and the verbal description may each be thought of as independently tending to produce a rating at



specific points along a given physiognomic dimension. The more discrepant these two points, the greater the tendency to "distort" facial attributes in the direction of the verbal sketch.

### C. METHOD

#### 1. *Ratings of Imagined Physiognomies*

Twenty-one college freshmen in an English class (Group I) were given two personality descriptions and asked to imagine how these persons would look. Each subject was then asked to rate each physiognomic image on a 32-trait scale of facial attributes (see Table 2), adapted from the study of Stritch and Secord (7). The descriptions were chosen largely from clusters of personality traits shown by Secord, Dukes, and Bevan (5) to form a coherent whole, and were as follows:

*Description A.* This man is warmhearted and honest. He has a good sense of humor and is intelligent and unbiased in his opinions. He is responsible and self-confident with an air of refinement.

*Description B.* This man is ruthless and brutal. He is extremely hostile, quick tempered, and overbearing. He is well known for his boorish and vulgar manner is a very domineering and unsympathetic person.

#### 2. *Distortion of Facial Perceptions by Verbal Personality Descriptions*

The procedure for testing the congruency hypothesis was as follows. Four male photographs showing only the head and face were combined with each of the two personality descriptions were presented to different groups of 21 college freshmen according to the following arrangement.

Group II .....	Pictures 1, 2, 3, 4 with no descriptions
Group III .....	Picture 1 with Description A
Group IV .....	Picture 2 with Description B
Group V .....	Picture 1 with Description B
Group VI .....	Picture 2 with Description A
Group VII .....	Picture 3 with Description A
Group VIII .....	Picture 4 with Description B
Group IX .....	Picture 3 with Description B
Group X .....	Picture 4 with Description A

Group I, responding to the verbal descriptions alone, and used to test the first hypothesis, provides us with the imagined physiognomies which are "appropriate" to the verbal descriptions. Group II, the control group,

provides us with physiognomic ratings for each picture which are minimally affected by personality factors.

Analysis of these data was conducted as follows. First, on each attribute, mean physiognomic ratings for the verbal descriptions alone were compared with the mean physiognomic ratings for the pictures alone. From this comparison predictions were made for each attribute for each picture as to the direction and magnitude of the change which would be induced by presenting the picture and verbal description together. In other words, suppose a photograph, when presented alone, is perceived as having rather thick lips. A verbal personality sketch gives the impression that a person has thin lips. When this photograph is presented with that sketch, the lips should be rated as somewhat less thick than they were when the photograph was presented alone.

#### D. RESULTS

An examination of the ratings of facial attributes of the individuals described only by verbal personality sketches reveals marked consensus among judges on a given description. For example, Description *A* creates the impression of a man with "bright eyes." Of the 21 judges, 13 rate him 1, six 2, and two 3, with no ratings in Categories 4, 5, 6, and 7 of the scale. Not all attributes are rated with such high agreement, of course. Table 1 lists attributes having the highest consensus, as defined statistically by a low standard deviation, and also indicates the rating scale position represented by the mean of the 21 judges for each description. Agreement over all attributes may also be assessed for each description. Agreement indices were determined by computing a Personian correlation coefficient from mean ratings obtained by splitting the judge group into halves, with  $N = 32$  attributes. These were .78 and .81, for *A* and *B* respectively.

The first hypothesis is that the two contrasting verbal descriptions will produce widely different physiognomic impressions. Table 2 summarizes the data which demonstrate this point. All but 7 of the 32 facial attributes are significantly different for the two descriptions, in one of two ways: (a) The mean ratings on a given attribute are significantly different for the two descriptions ( $p < .02$ ). (b) The ratings for Description *B* are significantly more extreme ( $p < .006$ ). Most of the differences are of the first variety, which were tested by the Wilcoxon matched-pairs signed-ranks test (6). Those differing in extremity of ratings are marked with an asterisk. The latter test was made by recording a plus for each attribute where *B* was rated more extreme than *A* and applying the sign test (6). The marked

contrast between the physiognomic impressions aroused by the two verbal personality sketches testifies to the ready facility of the perceiver in relating personality to physiognomy.

TABLE 1  
ATTRIBUTES HAVING MOST CONSENSUS ON IMAGINED PHYSIOGNOMIES

Description A		Description B	
Attribute	Scale position	Attribute	Scale position
Bright-dull eyes	bright	Mouth curvature	corners turned down
Hair grooming	neat	Facial tension	tense
Age	average	Harsh-soft lighting	harsh
Directness of gaze	toward direct	Age	toward older
Distance between eyes	toward close	Cheekbones	prominent
Straight-curly hair	average	Complexion	dark
Horiz. wrinkles	average	Brow	knitted
Mouth curvature	corners turned up	Set of jaw	hard
Thickness of lips	average	Horiz. wrinkles	many

TABLE 2  
IMAGINED PHYSIOGNOMIES FOR TWO CONTRASTING VERBAL DESCRIPTIONS OF PERSONALITY

Trait	Description A	Description B
*Grooming of hair	neat	slicked down or disheveled
*Waviness of hair	av. waviness	straight or wavy
Skin texture	av. texture	rough texture
Heaviness of eyebrows	av. heaviness	heavy
Height of eyebrows	av. height	low
Directness of gaze	direct gaze	averted gaze
Upward-downward gaze	upward gaze	downward gaze
Widened-narrowed eyes	widened eyes	narrowed eyes
*Eye depth	av. depth	deep or protruding
*Distance between eyes	av. distance	close or wide apart
Eye brightness	bright	av. brightness
Eye-corner wrinkles	many wrinkles	av. wrinkles
Knitted-relaxed brow	smooth brow	knitted brow
Horizontal wrinkles	av. brow	wrinkled brow
*Width of nose	av. width	wide or narrow
Straightness of nose	straight	av. straightness
Nostrils	relaxed	distended
Mouth curvature	corners up	corners down
*Fullness of lips	av. fullness	thick or thin
Set of jaw	av. set	hard set
Squareness of chin	av. squareness	square
Cheekbones	av. prominence	prominent
Complexion	av. shade	dark
Facial tension	av. tenseness	tense
Lighting	soft	harsh

Note.—The following additional physiognomic traits were not rated in a significantly different manner for the two personality descriptions: age, eyelid visibility, width of forehead, length of nose, size of ears, set of ears, width of face.

\* Traits marked with an asterisk differ significantly in that ratings for Description B are more extreme ( $p \leq .006$ ). Other traits have significantly different means ( $p \leq .02$ ).



TABLE 3  
SUGGESTED ANALOGICAL BASES FOR ASSOCIATION BETWEEN PERSONALITY IMPRESSIONS AND FACIAL ATTRIBUTES

Personality	Facial attribute	Basis of association
<i>Description A</i>		
honest	direct gaze	direct = honest
honest	widened eyes	widened eyes = open = honest
intelligent	bright eyes	{ bright = intelligent bright eyes = alert = intelligent
air of refinement self-confident }	upward gaze	looking up = pride = { refinement confident
responsible self-confident }	neat hair	neatness = { self-discipline = responsible pride in appearance = confident
self-confident	relaxed nostrils	relaxed nostrils = relaxed = self-confident
warmhearted	soft lighting	soft = warmhearted
overall impression: normal, well-balanced, conforming	average ratings	average or centered on scale = normal, well-balanced
<i>Description B</i>		
ruthless brutal hostile }	rough skin	rough skin = roughness = { harsh brutal
ruthless brutal hostile }	hard set jaw	hard = { brutal hostile
ruthless brutal hostile }	harsh lighting	harsh = { ruthless brutal hostile
hostile	dark complexion	dark complexion = dark mood = hostile expression
quick temper	{ distended nostrils facial tension	{ distension tension } = emotionality = quick temper
vulgar	{ slicked down or disheveled hair	poor grooming = vulgar
domineering overbearing }	heavy eyebrows	heavy = heavy pressure or force = aggression
overall impression: extremist or deviationist	extreme ratings	extreme ratings = extremist or deviationist

The wide discrepancies in imagined facial attributes for Descriptions *A* and *B* can occur only if the judges are responding in a systematic manner to the personality sketches and only if these responses are similar from judge to judge. The systematic nature of the ratings is due in part to culturally provided associations between personality and facial appearance, in the form of stereotypes and consensual facial expressions, a subject discussed elsewhere (4). In addition, however, reasoning by analogy also appears to underlie some of the associations. Some suggested analogies are outlined in Table 3.

The second hypothesis is that combining a verbal personality sketch with the presentation of a photograph will lead to distortion of perceived facial attributes in the direction of the physiognomic impression created by the personality sketch. Figures in Table 4 are frequencies representing the

TABLE 4  
PREDICTIONS OF PERCEPTUAL DISTORTION OF PHOTOGRAPHS BY PERSONALITY SKETCHES

*Predictor Criterion	Description <i>A</i>			Description <i>B</i>		
	No. of times con- firmed	No. of times discon- firmed	<i>P</i>	No. of times con- firmed	No. of times discon- firmed	<i>P</i>
Direction of difference	67	56	> .05	80	41	< .0002
Size of difference	71	52	< .05	67	59	> .05

\* Note: The predictor criterion is based on comparisons of sketch attributes and photograph attributes on direction of difference and size of difference. A prediction is confirmed when the sketch-photograph combination is rated in the predicted direction. For example, if a verbal sketch creates an impression of heavy eyebrows, and a photograph of medium eyebrows, the two combined should be perceived as heavier-than-medium eyebrows.

number of times a difference between the mean attribute rating of a personality sketch presented alone and a photograph presented alone result in distortion toward the sketch when the sketch and photograph are presented together. Since there are four photographs and 32 attributes, the potential total of attribute ratings which may be distorted for a given description is  $4 \times 32$  or 128. The *N*'s in the table are slightly smaller because in a few instances the separate mean ratings of sketch and photograph were identical, leaving no basis for a prediction. From Table 3 it is apparent that the data are consistent with the hypothesis for both descriptions, although the difference for Description *A* is not sufficiently large to be significantly different.

A corollary to the above hypothesis is that the greater the difference between sketch attribute and photograph attribute, the more frequently the photograph attribute will be distorted toward the sketch when the photograph and sketch are rated as a unit. Table 4 reveals that although these ratings were more frequently in the predicted direction, only for Description *A* does the difference approach significance ( $z = 1.62$ ;  $P = .053$ ; one-tailed binomial test).

### E. DISCUSSION

From the foregoing results it is clear that given personality information about an individual in the form of a verbal sketch, subjects can readily produce impressions of the details of his facial appearance. Moreover, there is much consensus among judges on ratings of facial appearance, implying that the judgmental process is based upon systematic associations between personality impressions and facial attributes. This consensus is thought to be produced in part by two factors. One is the culturally provided associations between personality and facial appearance and the other is the use of analogy to bridge the gap from personality impression to facial attribute. The latter process has been termed metaphorical generalization. The forms of analogy outlined as occurring in the present investigation may well occur in widely different circumstances, such as those informal face-to-face situation where role relationships or behavioral information are too scanty to form an adequate basis for judgment, or in more formal situations such as personnel evaluation interviews, where the demand placed upon the interviewer exceeds the information which a brief interview is capable of providing. Metaphorical generalization may also support the formation of appraisals of another person in a direction dictated by motivations to form a certain opinion of the other.

The tendency toward congruency, also demonstrated in the present investigation, tends to operate as another source of "error." The disposition of the perceiver to organize perceptual data so as to achieve maximum consistency and integration means that some of the elements of information must be altered in the interests of a more unified impression. One form of this tendency toward congruency is the well-known halo effect.

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## THE DIFFERENTIAL NATURE OF PREJUDICE REDUCTION\*

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### A. PROBLEM

One of the problems which has concerned social scientists during the last few decades is how to devise means by which racial prejudice can be reduced. Studies in this area have typically involved testing the effectiveness of particular methods which are purported to reduce racial prejudice using whatever criteria seemed appropriate to the investigator. These studies have recently been summarized by Allport (2), Saenger (7), and Harding, Kutner, Prohansky, and Chein (5). The latter authors have emphasized the importance of measuring racial prejudice in terms of affective, cognitive, and conative components, and specifying the effect of a given change procedure on each component. In this connection they state that it is necessary to examine "the functional dependence of intergroup attitudinal components on each other. Do changes in any one of them necessarily imply corresponding changes in the others? There is very little direct evidence on this point" (5, p. 1030).

The problem of the functional dependence of components of racial prejudice has both practical and theoretical importance. From a practical viewpoint it is necessary to know whether one can change the most tractable aspect of racial prejudice and assume that other aspects will show an equivalent change. If this is the case the practitioners task is simplified. If this is not the case, however, the practitioner must consider the possibility of having to change each component of racial prejudice by a different means.

From a theoretical viewpoint the degree of functional dependence between the components of racial prejudice has direct implications for a general theory of personality change. Racial prejudice may be viewed as a sample personality attitude. To the extent that this is the case the functional dependence between the cognitive, affective, and behavioral aspects of this attitude may be representative of the functional dependence of these components in other attitudes and aspects of personality.

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<sup>1</sup> Based on a paper presented at the 1958 convention of the American Psychological Association.

With these considerations in mind the present study was undertaken in order to determine whether change in one component of racial prejudice is reflected by parallel changes in other components.

## B. METHOD

In order to determine whether cognitive, affective, and behavioral aspects of racial prejudice are functionally related, measures of these variables were obtained from the members of several small inter-racial groups near the beginning and near the end of their small group experience.

The experimental subjects were members of a graduate course in Education. Forty-seven of the subjects were white and 31 were Negro. Thirty of the white subjects were Protestant and 17 were Catholic. Thirty of the Negro subjects were Protestant and one was Catholic. Thirty-four of the subjects were males and 44 were female. Forty-two of the subjects lived in the North and 36 lived in the South. The median age of the subjects was 30. The age range extended from 22 to 60 years.

The subjects were assigned to six-man groups by a system of random numbers. Thirteen such groups were formed, consisting of a total of 78 persons. Group members were not previously acquainted with each other. Each group met in leaderless group discussion four times a week over a three-week period. Each meeting varied in length from one hour to one hour and a half. These leaderless groups were an integral part of the graduate course in which all subjects were enrolled. The course emphasized the importance of democratic sharing of ideas, feelings, and experiences. The groups were designed to provide a setting for such a democratic sharing. They therefore provided a setting for inter-racial group contact characterized by the elements which Allport (2) has described as tending to reduce racial prejudice, namely: equal status, institutional sanction, and common goals (as defined by the course content). The conditions were, therefore, such as to encourage prejudice reduction in one or more of the components of racial prejudice.

### 1. *Instruments*

Three instruments were used in order to measure change in the cognitive, affective, and behavioral aspects of racial prejudice.

The *E* Scale from the California Public Opinion Survey was used in order to obtain a measure of the cognitive aspects of racial prejudice. Only the "patriotism" subscale of the total *E* Scale was used in order to increase the speed with which the *E* Scale could be administered. This subscale is reported by Levinson (1) to have a correlation of .92 with the total *E*



Scale. A split-half reliability check of the subscale yielded a coefficient of .78 which compared favorably with the split-half reliability of .80 reported by Levinson (1).

A Sociometric Questionnaire was used in order to obtain a measure of the affective aspect of racial prejudice. This questionnaire required that the individual rank order the group on the criterion "whom would you most like to continue to be friends with at the end of the summer session?" This questionnaire was adapted from Ausubel (3). Since Ausubel, Schiff, and Gasser (4) found that the sociometric choices of subjects using the questionnaire were positively skewed, a forced choice procedure was introduced into the questionnaire used in the present study in order to correct for this tendency.

In order to obtain a measure of the behavioral aspect of racial prejudice each group member was asked to rank other group members on the criterion "amount of racial prejudice." It was assumed that when group members ranked each other on this criterion, they were responding to the behavior or behavioral tendencies which they observed in other group members.

All of these instruments were administered to all experimental subjects at the third and eleventh general class sessions of the graduate course which they were all attending.

### C. RESULTS

In order to be able to test the degree of functional dependence which existed among the components of racial prejudice, it was necessary to establish that, at least, one of these components had undergone a significant change during the course of the small group experience. A comparison was therefore made of the early and late *E* Scale scores by the use of a Mann-Whitney *U*-test. A critical ratio of 2.67 was obtained indicating that the cognitive aspect of prejudice had been reduced.

Pre-post difference scores were then derived for each measure of prejudice for all 78 subjects. These difference scores were correlated with each other in order to determine whether the three components of prejudice were, in fact, functionally dependent. A correlation of  $-.12$  was obtained between the cognitive and affective pre-post difference scores. A correlation of  $.09$  was obtained between the cognitive and behavioral pre-post difference scores. Finally a correlation  $-.05$  was obtained between the behavioral and affective pre-post difference scores. None of these correlations are significant. The results of this study indicate, therefore, that there is no functional dependence among the cognitive, affective, and behavioral components of racial prejudice.

## D. DISCUSSION

The findings of the study are negative. The reliability of the measuring instruments must therefore be considered, since lack of findings may be due to low reliability rather than lack of relationship. The *E* Scale was reported earlier to have a split-half reliability of .78. Ausubel reports a corrected split-half reliability for the Sociometric Questionnaire on which the present Sociometric Questionnaire is based of .90. The reliability of the group members prejudice ranking has not been determined. However in a previous study (6) the author found that this measure correlated as high as .54 with other measures indicating that the measure must have reasonable reliability. The evidence would seem to indicate, therefore, that the lack of positive findings cannot be attributed to the unreliability of the measuring instruments.

For the practitioner interested in the reduction of racial prejudice these findings suggest a pessimistic but important conclusion, namely that each component of racial prejudice must be reduced separately since change in one component is unrelated to change in other components. This conclusion suggests the importance of determining the differential effectiveness of various prejudice reducing techniques on the various components of racial prejudice. It seems reasonable to assume that different techniques influence different components. If this proves to be the case it would be important for the practitioner to give increased emphasis to accurate differential diagnosis of the relative contribution of the various components of racial prejudice in any given situation and base his choice of remedial technique upon the results of such a diagnosis.

From the theoretical point of view the findings suggest a three-factor approach to the change process. It has often been customary to view personality and attitudinal change as a global process in which the whole personality is reorganized or reconstituted. The present findings suggest that differential changes in cognitive, affective, and behavioral components of an aspect of personality are possible. This finding has important implications for a general theory of personality change and deserves to be replicated on other aspects of personality.

## E. SUMMARY

This study considered the functional dependence of the cognitive, affective, and behavioral components of racial prejudice. The subjects of this inquiry were 78 students participating in a graduate course in Education. Each subject was randomly assigned to a six-man group. These groups met in leaderless group discussion four times a week over a three-week period.

During the first and third week three questionnaires which measured cognitive, affective, and behavioral aspects of racial prejudice were given to all subjects. Pre-post difference scores were computed for each subject on each measure and these difference scores were intercorrelated. The results of this analysis indicated that (a) the cognitive measure of prejudice decreased significantly during the course of the group experience, and (b) there was no functional dependence between cognitive, affective, and behavioral components of racial prejudice.

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## AN APPROACH TO EVALUATING THE ACHIEVEMENTS OF GROUP PSYCHOTHERAPY\*

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In order to evaluate group psychotherapy it is necessary to know its goals or objectives. Knowledge of the objectives may yield standards in terms of which to evaluate achievements. More bluntly, we cannot tell how well we are doing until we know what we are trying to do. It may, therefore, be helpful to distinguish between two kinds of objectives of the psychologist, objectives related to two roles he may play: that of scientist and that of practitioner. As a scientist his objectives may be to test various theories or hypotheses. As a practitioner his objectives are to make mentally sick people well or, at least, to bring about decreases in manifested abnormal behavior. The present paper deals with evaluating achievements of the latter objective. Before such evaluation can be undertaken, the question has to be faced: How does one know that a patient is getting well or that there is a decrease in abnormality? We suggest the use of appraisals of the patient's behavior made by the patient and by others with whom he comes in contact in his everyday world. A decrease in manifested abnormal behavior is to be indicated by an increase in positive appraisals and a decrease in negative appraisals. The efficacy of group psychotherapy may be measured in terms of the extent to which it succeeds in maximizing positive and minimizing negative appraisals of the patients.

Implicit here is the assumption that what is considered abnormal may depend on appraisal, an assumption aptly put by Hollingshead and Redlich:

Abnormality depends upon appraisal. . . . Appraisal, as an interpersonal process, entails how a disturbed person and his actions are perceived and evaluated by the individual and by other persons in the community. Appraisal will determine what is judged to be . . . psychiatric troubles (1, p. 172).

Most of our experience with the suggested approach has been with group psychotherapy for patients confined to a public hospital. For such patients

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<sup>1</sup> This paper is an address presented in a Symposium on Group Psychotherapy held at the 1958 meeting of the American Psychological Association in Washington, D. C.

the everyday world is necessarily the hospital. It may be helpful to think of the group psychotherapy sessions as constituting the apex of a triangle and the non-hospital community as the base of this triangle. The hospital may be regarded as lying between the apex and the base. (This triangle represents increasingly complex social structures as one goes from the apex to the base.) In terms of the triangle representation, the efficacy of group psychotherapy or of a specific method is to be evaluated not merely in terms of what happens at its apex but in terms of the transfer effects as the patient goes from its apex and approaches nearer to its base. If the extent of positive evaluations is measured in a plane perpendicular to the plane of the triangle, then the efficacy of a group psychotherapy program or of a specific method may be regarded symbolically as a joint function of two variables: the distance which its transfer effects radiate from the apex toward the base and the distance which they project in the perpendicular plane.

In applying the proposed approach, we did not limit appraisals to those based on observations of the patient during the group therapy sessions but tried to base them on as large a sector as possible of his everyday world. Moreover, appraisals were obtained not only from the therapist and other specialists but also from the group members and people in various positions with whom the patient came into contact. It was sometimes found, as may be expected, that diverse, conflicting appraisals were obtained of group therapy and even of a particular patient. For example:

The ward and hospital administrator gave favorable appraisals, noting that more patients were receiving therapy and that they now had a therapy-oriented rather than a custodial ward. But a psychiatrist who was treating some of the patients said that group psychotherapy was not of value because it did not deal with underlying problems that have to be dealt with if these patients are to recover.

The group therapist, on the basis of comparisons of group members' overt behavior at the beginning and end of the program, concluded that most patients had made considerable progress. But another psychologist, who administered tests to these same patients at the beginning and end of the program, found little change in their test results and concluded that the patients had made little progress.

Even the same behavior has been appraised differently. An increase in patient activity was positively appraised by a psychiatrist (on the grounds that it indicated increased spontaneity and more active interest in their surroundings) but was negatively appraised by aides on the ward (on the grounds

that it disturbed ward routine, made patients more difficult to control, and interfered with performance of the aides' prescribed duties).

Consider one more example: a withdrawn patient, after some time, began joining other group members as they left a session to go to the dining room. At each meal period he put two to four glasses of milk on his tray (but nothing else), sat down at a table with the others, drank the milk, and occasionally joined the conversation. Previously he had not gone into the dining room, had not voluntarily taken either food or drink, and had rarely spoken to others. The group therapist evaluated this change in behavior as a sign of improvement. But the hospital's psychiatric consultant, far from regarding it as a sign of improvement, said that it was a sign of regression. The patient had regressed to the infantile level of subsisting solely on milk!

Discussions with the different appraisers suggested that their judgments were influenced by what they expected from group psychotherapy and from the patients. Moreover, their appraisals were related to the effect that group psychotherapy had on enhancing or detracting from what they considered efficient functioning in their positions.

It is not unreasonable for a staff member to judge group therapy in terms of his position's goals and role requirements. Group therapy may have negative effects on members who fill various positions in the institution in which it is conducted. Activities permitted in the group therapy sessions may be carried over, with negative effects, to other situations and other positions in which the patient finds himself. For example, outspokenness, frankness, and spontaneity, encouraged in group sessions, may carry over to other situations where such behavior may be detrimental to the on-going activity or to the performance of other people's duties. A staff member has a legitimate claim if group psychotherapy interferes with the efficient functioning of his position since he is evaluated in terms of the efficiency with which he fulfills his position's goals and requirements.

Even if the group therapist recognizes the legitimacy and reasonableness of negative appraisals, he may ignore them, in the hope that eventually favorable appraisals will be elicited. He may regard the patient's difficulty as rooted in intrapsychic conflicts and hope that their resolution may result in the patient's getting along better with others and hence, in the long run, make for positive appraisals. But other's reactions may help to create a social atmosphere that interferes with group psychotherapy, impedes the progress of the patients, and creates problems for the therapist. Therefore, it is suggested that the therapist seriously consider the appraisals and try to understand on what basis they were made.



To get an understanding of why patients are appraised as they are, and to get suggestions as to what he can do to enhance positive transfer effects, the therapist has to know something about the people in the patient's world, about the positions they fill, the goals and role requirements of the positions, the social norms and values that regulate the positions, and what it is these people expect from the patients and from group therapy. This suggests that he should not be concerned solely with the dynamics of the group, but should seek to understand the social field of the hospital and as much as possible of the social field of the non-hospital community. In turn, the therapist may want to give other people in the patient's world an understanding of what he expects from them, from the patients, and from group therapy. To do these things calls for exchange of information between the therapist and salient individuals in the patient's world. An important area for action research is to develop methods for such exchange as well as to develop opportunities for these people to arrive jointly at decisions concerning what they expect of the patients and group therapy. Such joint decisions may help to lessen the likelihood that different people in and out of the hospital will be working at cross purposes. It may also help to decrease negative evaluations of the program and the patients. On the basis of information supplied by the group therapist, other people in a patient's world may be willing to modify what they expect from a group member or from the program. Our experiences suggest that the therapist should also be prepared to modify his views, his methods, and his policies.

We have been experimenting with methods of studying the social structure and social processes of a hospital, with special reference to the positions in it, and of developing lines of communication through which feedback can be obtained from various individuals in a patient's world. These methods are described in a report called, *A Study of a Mental Hospital* (4). Here we will summarize some of these methods.

An operational analysis of the hospital was made before a particular group therapy program began and was continued throughout its existence in attempts to ascertain how the program was influenced by and how it in turn influenced the hospital's social structure and processes. Emphasis was on the wards and other hospital groupings from which group members were selected. Key members filling various positions in these groupings, from the aide to the chiefs of the services, were consulted. They were taken into the planning phase of the group psychotherapy program for the following reasons: (a) to find out what problems they thought we could help them solve; (b) to get their reactions to our specific objectives and proposed methods as

well as their suggestions regarding objectives and methods; (c) to indicate the kind of cooperation we hoped to give and hoped to get from them and to have them tell us the kind of cooperation they thought they could offer; (d) to get appraisals from them of the patients before, during, and after participation in group psychotherapy and to get their impression of problems and difficulties group therapy was creating for them in their hospital positions.

A so-called group dynamics workshop was instituted, to bring together for exchange of information, the therapist, other hospital staff members, and community members. Here were discussed what group members were doing and what changes had been noticed in the patients in the ward and other situations. Emphasis was on reducing the likelihood that members of various positions in and out of the hospital would be working at cross purposes in their attempts to help the patients get well and with regard to what they expected of the patients and group therapy. In the workshop plans were made to attempt to solve some of the problems that the workshop members thought the group psychotherapy program might help them with, as well as some of the problems which they attributed to the program. Attempts at solution sometimes called for changes by the therapist. But at other times changes in the conduct of a ward or work detail or even changes in hospital administrative policy resulted from the exchange of ideas in the workshop. Moreover, when it was found that a group member's actions seemingly interfered with existing methods of fulfilling goals and role requirements of various positions in the hospital, the workshop served as a base for action research to determine if and how (a) the patient's behavior could be altered, or (b) existing methods of fulfilling the goals and role requirements of the various positions could be changed, or (c) the existing goals and role requirements of the positions should themselves perhaps be altered.

The operational analysis of the hospital and the group dynamics workshop are proposed as methods to be further explored in attempts to enhance and to evaluate the achievements of group psychotherapy.

Let us now discuss some of the problems involved in the proposed approach. From whom should appraisals be sought and when should they be sought?

How can appraisals be obtained from reluctant appraisers? What methods should be used in determining the validity and reliability of appraisals? Specifically, how can it be determined to what extent an appraisal is based on personal likes, dislikes, or other personal idiosyncracies of the appraiser and to what extent it is based on the patient's actions and on the role requirements of the appraiser's position in relation to the patient? An urgent



problem here is to determine what are the legitimate role requirements of various positions and to what extent appraisals are based on the legitimate powers of those in control of the positions. This is a problem which probably cannot be solved by psychologists alone but should be tackled in conjunction with other behavioral scientists together with various members of the hospital and the community.

Other problems concern what should be done with conflicting appraisals. Should the therapist pay more attention to some appraisers than to others or give more weight to some appraisals than to others and on what basis should this be done? Our experience indicates that it cannot be based on the position the appraiser has in the hospital's pecking order.

In order for the therapist to have an idea of the extent of positive appraisals and the extent of negative appraisals made within a given period of time, it would be of value to have some way of quantifying an appraisal so that its direction and extent or intensity is determined. How can this be done?

There are also complex methodological problems involved in attempting to ascertain the influence which group psychotherapy per se has on appraisals, to tease out or isolate from other influences on changes in appraisals, the contribution solely of group psychotherapy.

Finally, there are the practical problems involved of how to determine whether or not group therapy is operating to maximize positive appraisals and/or minimize negative appraisals of a specific patient or of the program, of how to determine the transfer effects of the program or of a specific method, and of how the therapist can use appraisals as a concrete guide in determining the kinds of changes he ought to introduce in the group psychotherapy program and the points at which he ought to introduce them.

It is hoped that further attempts to utilize the suggested approach may yield answers to some of these questions. Such attempts may also yield data which suggest some answers to the many open questions concerning the who, what, when, and where of group psychotherapy. For example, the data may indicate that in a given social context positive evaluations of the group and of the patients were greater when a group of one size than when a group of another size was used or when the duration of each group session was of one length rather than another or when the group met in one place rather than in another place.

It should be noted that positive appraisal of the patient's behavior may require that he conform to socially accepted patterns of behavior. Hence



group therapy, if its task is to enhance positive appraisals, seemingly attempts to influence or control a patient's behavior so as to channelize it into approved patterns. Group therapy may therefore be regarded as a form of social control and the therapist as an agent of social control. Moreover, what constitutes efficient functioning in the outside community and even in the hospital community is, to a considerable degree, determined by social norms or public policy. The implication is that group therapy is a form of social control regulated to a considerable degree by public policy.

Disturbing as this implication may be to some, it seems to the writer that the therapist cannot divorce himself completely from public policy. The very fact that the public permits group therapy for these patients, rather than jailing or executing them, is itself public policy. The suggestion that the therapist consult with other people in the hospital and the community is clearly a suggestion that the practitioner take public policy into account. To ignore public policy may invite negative appraisals and may lessen the effectiveness of group therapy.

At this point the spectre of "brainwashing" and "thought control" may rise before your eyes. You may envision group psychotherapy turned into an attempt at manipulating people in order to bring about social conformity. But what has been said does not imply that the group therapist has to aim at turning out robots. A democratic society presumably places high value on a person capable of making decisions and of participating in the creation or formulation of public policy. Hence the therapist, as an agent of social control in a democratic society, aims at developing the patient's decision making capacity, even if the therapist's theoretical working model of man is closer to homo mechanicus, man as a machine, or homo volens, man as an emotio-conative creature, than it is to homo sapiens, man as a thinking being.

This brings us to a problem of professional ethics. The present policy of our society presumably is to enhance one's decision making capacity; but suppose this changes to a policy that emphasizes robot-like qualities. Should therapists be guided by the changed policy or are we committed to the preservation of characteristics associated with the homo sapiens model of man just as the physician is committed to the preservation of life?

Our proposals do not imply that the therapists must accept as invariants either existing public policy or the demands various positions exert on group members. For example, the therapist may participate with others in the group dynamics workshop in seeking to change role requirements of various

positions in the social field. Generally speaking, instead of attempting only to change the patient's psychic structure so that he fits into the social field of the hospital or the community, the therapist may also try to change the social field to bring about therapeutic improvement in the patient (cf. 2 & 3). In other words, he need not restrict himself to doing group psychotherapy *in the small* (that is, confined to the formal group therapy sessions) but instead may attempt to do group psychotherapy *in the large* in the sense of utilizing and manipulating various existing groupings and social structures for therapeutic purposes. Also, as a psychological expert (and as a citizen) the therapist may participate in determining public policy.

As a final note let us return to the two roles of the psychologist in group psychotherapy, that of scientist and that of practitioner. We do not intend to imply that the two roles are entirely distinct. For examples, as a scientist the psychologist may utilize the fruits of his own and others people's practical experiences with group psychotherapy to test and to build theories and hypotheses; as a practitioner the psychologist may utilize theories, as well as concepts and implications related to theories, as guides in achieving therapeutic objectives. But there may be some danger in confounding the two roles. For example, something the therapist does in group therapy may seem theoretically or psychologically sound but may not be practically feasible if it conflicts strongly with what most other people in the patient's world expect of him or with the requirements of their positions in relation to the patient. It is important for the therapist not to confuse the wishbone of his theory with the backbone of the practical requirements of the situation. What we are particularly concerned with is the therapist who is so convinced that he is a scientist with a capital *S*, that he forgets his practical objectives, who, for example, regards the task of testing hypotheses derived from theories as more important than that of curing patients, who is so blinded by a particular theoretical orientation that he loses sight of whether or not his patients are getting well, or who thinks that he or the science of psychology has *the* answers to the problems of what is normal or abnormal, of what constitutes effective functioning in various positions, or of how people in these positions should behave toward his patients or appraise his patients. Basal to the approach suggested in the present report is the idea that the practitioner should pay attention to answers to such problems which are proposed by non-psychologists and to so-called non-psychological variables which he can utilize for therapeutic purposes. In short, it is suggested that as a practitioner the psychologist should not arrogate the attributes of omniscience to himself or to psychology.

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## SHORT ARTICLES AND NOTES

*The Journal of Social Psychology*, 1960, 52, 355.

### A CORRECTION IN MELIKIAN'S "PREFERENCE FOR DELAYED REINFORCEMENT"\*

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Levon Melikian ("Preference for delayed reinforcement: an experimental study among Palestinian Arab refugee children," *J. Soc. Psychol.*, 1959, 50, 81-86) refers to findings in an earlier study (Mischel, W. "Preference for delayed reinforcement: An experimental study of a cultural observation," *J. Abnorm. & Soc. Psychol.*, 1958, 56, 57-61.) and writes (p. 81):

"Preference for delayed reinforcement in human Ss has been demonstrated to be a function of age and of the presence of a father within the home. The younger the child the greater his preference for an immediate reward while the presence of a father in the home, with the security which it tends to impart to the child, seems to encourage such a preference."

The final part of this statement is unclear and may mislead readers. In my findings, presence of the father in the home was related to greater preference for delayed, larger (as opposed to immediate, smaller) reinforcement. It should be noted that "such a preference" in the above quotation refers to preference for *delayed* reward, not to preference for immediate reward.

Several researchers have been confused by Melikian's summary of my findings and this note is aimed at avoiding any further misinterpretation.

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1. MISCHEL, W. Preference for delayed reinforcement: An experimental study of a cultural observation. *J. Abn. & Soc. Psychol.*, 1958, 56, 57-61.

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## BOOKS

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Now that there is a special APA journal completely devoted to the publication of book reviews, it is no longer necessary that other journals emphasize such publication. It has always been our conviction that book reviews are a secondary order of publication unless they carry information that is equally important as the book. However, the publication of book titles is a very important service, and we shall continue to render that service.

In any given issue of this journal, we may continue to publish one or more book reviews, but we do not consider such publication a major function of this journal. In line with this policy, we can no longer pay for such manuscripts.

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(Cattell, R. B. *Personality and Motivation: Structure and Measurement*. New York: World Book, 1957.)

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REVIEWED BY J. A. RADCLIFFE

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In 1946, in his *Description and Measurement of Personality* (3), Cattell presented an integrated account of his achievements and aspirations on personality structure and measurement at that stage. He has since been such a prolific writer in this area that it has been difficult to gain an overall impression of his theoretical and research contributions. Now he has provided a second much bigger and more systematic integrated account—*Personality and Motivation: Structure and Measurement*. This book incorporates his more recent work and opens up, in an enthusiastic and stimulating way, 'a comparatively new world of personality structure.' It also presents a new opportunity for a critical appreciation of Cattell's overall contributions and for this task the six sections of the book form a convenient framework. The general plan will be to present a critical summary of some of the main points and line of argument in each section of the book but the discussion will not be restricted to this context—reference will also be made to some of his contributions since the book was published, including some so far unpublished. As a reflection of personal interest the main emphasis will be on Cattell's methodological contributions.

### I. *Personality Research Methodology*

Cattell argues that science in general, and psychology in particular, require sound observation, effective measurement, and appropriate classificatory principles. To these ends he conceives *factor analysis* to be a most suitable technique.

It is the psychological 'analogue of the microscope,' especially when there is rotation to *oblique simple structure*. Psychology must be 'operational.' Though tentative hypotheses will guide the search, it must seek 'limited laws of relationship' and be less concerned with 'grandiose theory.' Again, factor analysis is particularly suited to finding relationships and generating theories. Thus, Cattell always 'begins descriptively and ends interpretatively.'

*Analytic multivariate experiment*, especially that using factor analysis, is to be contrasted with *controlled manipulative univariate experiment*, the distinction resting on the number of variables being studied. In this sense even complex analysis-of-variance designs are univariate. Psychology has suffered from over-specialisation by the experimentalist in the univariate design and from his failure to recognise the complementary nature of the two. For example, multivariate procedures will reveal 'functional unities' which may then be subjected to univariate experimental investigation. Moreover, factor analysis will not only indicate what should be studied more intensively but may also be used in this more intensive study. Cattell insists that it is fallacious to believe that factor analysis is restricted to a "response-response psychology" (Spence). By appropriate modifications, including *condition-response* and *incremental-R* designs, it may be used effectively so study causal relationships.

Few will want to disagree with Cattell's views on the need for measurement for scientific progress in psychology, but many may not share his faith in the role of multivariate analysis, especially factor analysis, in this progress. It is not clear why he believes the multivariate method is necessarily more 'life-like' in the data it uses, nor why the sheer number of simultaneous relationships being studied is necessarily an advantage. The data may well be, as a consequence, far less reliable than that obtained under controlled univariate conditions, though, in fairness, the factor analyst seems to have been the more sensitive of the two to the effects of data unreliability. In these days of increasing specialisation it is optimistic of Cattell to expect the graduate student to be *trained* in both the factor analytic and the more traditional methods, but his plea that he should at least be *acquainted* with their potential co-operation is perhaps timely.

Doubts about the role of factor analysis in scientific progress in psychology may also derive from Cattell's actual use of the method. The problems of communality estimation and the number of factors disturb him less than they do many other factorists. Insisting as he does that the 'mathematical simplicity of orthogonality' must be abandoned in favour of the 'greater psy-



chological reality' of oblique factors,<sup>1</sup> he is generous on the extraction of factors and seems to believe that rotation to oblique simple structure will eliminate any "surplus" factors and will automatically reveal "what is in the data." Apparently he believes that if a factor is interpretable then it must be "significant"—psychologically, if not statistically. But some of his rotated factors make such a small contribution to the variance that one wonders if they are 'psychologically significant' even if they are statistically significant. In fact Cattell is so wedded to factor analysis that there is sometimes a suspicion that it has almost become promoted from the status of a *method* to that of a *theory* of the mode of functioning of natural phenomena—dimensions are correlated in the way they function; as a working assumption, the linear model applies to all events; and so on. That psychology must become 'a quantitative and rational science' seems axiomatic, but with Cattell the quantification sometimes seems to become the superordinate of the two. However, it remains that, at least much of the time, one cannot but agree with Cattell that the theories which he has "derived from measurement (may) be no less systematic, ingenious, and profound—and certainly no less effective" (p. 4).

Central for Cattell is the distinction which he made earlier (3) between a *surface trait* and a *source trait*. A surface trait is a correlation cluster, or a syndrome. A source trait is an intersection of hyperplanes, or a factor. Both are dimensions, but only a source trait is a dimension 'in the full sense.' The vectors defining a surface trait are located by factor (source trait) co-ordinates. Yet he also states that a source trait is *not* a factor but it is a 'genotype of which a factor is a phenotype.' This is because factor patterns are sensitive to changing conditions, while still reflecting the same source traits. *Cluster analysis*, as a technique, will identify surface traits, but only *factor analysis* will unequivocally isolate source traits, and then only provided the investigator has sufficient rotational patience and skill.

Apparently Cattell intends that source traits are the hypothetical causal conditions of surface traits and conceives them to be the more "real" and the more "explanatory" of the two, though why only causes may be dimensions

<sup>1</sup> The student may be confused by his treatment of the distinction between *factors* and *reference vectors* on p. 307 of his book. His description of a *hyperplane* given in the text as that "nebula of points . . . (from which) the *position* of a factor is found by discovering this nebula and putting a coordinate at *right angles* to it" (p. 307; italics not in original) is inconsistent with his footnote. His textual description is, of course, referring only to the orthogonal case. And the distinction is not helped by the illustrative diagrams he gives. They have no identifying letter labels and two are supposed to show both hyperplanes and reference vectors, whereas only one actually does.

'in the full sense' remains obscure. He effectively argues that locating a factor is more a means than an end. A factor (or source trait) is an intervening variable whose "surplus meaning" (Meehl-McCorquodale) constitutes a challenge. As does Eysenck, he now regards the main factors as having been located and the principal future task to be their clarification (c.f. his studies on the nature-nurture ratios of the primary personality factors). Though he has not given it as much specific attention as has Eysenck—probably because he is less convinced than Eysenck that personality may be described in terms of only a few dimensions—he would also agree with the need for closer integration between the dimensional and the more general theoretical approaches to personality study. In fact he conceives this as the ultimate aim of personality research and that he has been less specific than Eysenck in this area could derive also from his lacking Eysenck's faith that there already exists an adequate theoretical framework for such an attempt. Cattell has to build his own.

Within these hypothesis testing and theory building phases Cattell concedes that univariate experimentation may be necessary for a thorough investigation of causal relationships, but he is convinced that factor analysis may also be effective, especially some of the factorial techniques additional to R-technique. He has expanded on his *covariation chart* to allow 50 different factorial designs, not all of which, fortunately perhaps, are feasible! Some of his new designs permit the inclusion, for example, of stimulus conditions and time sequences, and provide for the study of conditions affecting factors. Others greatly extend the kinds of relationships which may be simultaneously studied. If an example which he gives were, for instance, used with ratings, it would permit the simultaneous study of the reliability of ratings and the stability and covariation of attributes. And, as he points out, their use is not restricted to factor analysis. Cattell's covariation chart and the alternative designs it promotes are an important methodological contribution. Some of them contain difficult technical problems and their efficacy remains to be seen, but to dismiss them airily, as does Eysenck (15), seems premature.

There are some doubts, though, on the *type of causal hypothesis* which Cattell insists factorial techniques may investigate. Sometimes he means hypotheses concerning the conditions affecting the occurrence and the operation of factors and, for these, factorial techniques seem appropriate, including perhaps particularly some of his newer alternative designs. But at other times it is clear that he is referring to hypotheses about the *causal character of the factors themselves*. For these he considers that appropriate inference will allow even the use of the more conventional R-technique design. Now



there is no doubt that a factor indicates the operation of some causality. All that is in doubt is that the factor can itself indicate the *nature* of the causality. Of course, Cattell is well aware of this and constantly stresses that factor analysis *generates* hypotheses. Depending upon the nature of the hypothesis, it may also *test* hypotheses, as he insists. What is being questioned is merely that it may also be used to test hypotheses about factors as *causal entities*—and he seems to interpret factors in this way and to believe this type of interpretation may be tested factorially.

He appears to regard factors as antecedent causal conditions when he identifies the *factor specification equation* with the *generalised stimulus-response formula*. For example:

If score in a competition for after-dinner speeches is constituted  $P = 0.6F_B + .5F_F - .8F_O$ , where  $F_B$  is intelligence,  $F_F$  surgency,  $F_O$  timidity, then we can expect an actual psychological process in which intelligence *produces* good selection of wit, surgency *aids* the expression thereof by a natural verbal fluency and expansive manner, while anxiety (timidity) *blocks and disorganises* whatever is in the process of expression (p. 304; italics not in original).

Cattell strongly criticises the “faculty error” and then, like Spearman, succumbs to it himself. He conceives the faculty error to be that of assuming that a single *term* implies a single function—and then himself implies that a single *factor* implies a single function! But, more particularly, he overlooks that the “faculty error” consists primarily of the *naming fallacy*—that of assuming that the cause is of the same nature as its effects. And in this sense he clearly commits the “faculty error.” He is attempting to avoid this difficulty with his surface vs. source trait distinction but that he has indifferent success is illustrated by the above example and by his admission that “the sectors found by grouping clusters (cluster analysis) have an almost one to one relation with factors (source traits?) extracted from the same trait elements” (p. 807; words in parentheses not in original). However, it may be that Cattell interprets his factors in this causal way because he has all the data at his fingertips and that, as he says, it is impossible to convey everything from which interpretations are made. Moreover, it conveys ‘good psychological sense’ and to offer these criticisms may represent the rigid ‘aping of the physicist’ against which he so strongly argues.

Nowadays, Cattell does not define *personality*; nor does he present any concept of *personality structure* analogous, for example, to that of McDougall or Allport. These omissions are intentional and constitute no handicap. Personality structure refers to the dimensions of temperament, ability, and



motivation isolable by factor analysis. Personality refers to the totality of data (especially on traits) from which behaviour may be predicted via the factor specification equation. At first this prediction will be "statistical" (Meehl), but with increasing knowledge the factors will acquire "surplus meaning" so that ultimately there will be "clinical prediction"—there will be both prediction and explanation. But perhaps Cattell might well be content with prediction alone. To quote Burt: . . . "The modern physicist no longer claims to describe what . . . a thing 'is'; all he seeks to do is to describe how it behaves. He has therefore deliberately abandoned the attempt to invent a visible or mechanical model for explaining atomic *structure* and is content to devise mathematical models for predicting atomic *events*" (1, p. 78).

Within his actual research programme, Cattell's aims seem to be (a) to locate and identify personality dimensions: (b) to improve their measurement; and (c) to clarify their interpretation. Though he has produced a number of well-known tests for applied use, he probably conceives his main role to be exploratory and interpretative. Thus his investigations are usually on a large scale and, though he is fully aware of reliability requirements,<sup>2</sup> particularly with his more recent objective approaches to personality measurement is he more content to include variables of low reliability than most other factorists—except perhaps Eysenck! To indicate 'true relationships' he uses correction for attenuation.<sup>3</sup>

Provided reliability be conceived as *dependability*, or correlation between immediately replicated measures (an interpretation which Cattell favours), internal consistency estimates of reliability (as many of Cattell's are) are not necessarily a handicap to the factorist. The factor analysis may indicate what the test appears to be measuring, as opposed to what it was originally conceived to be measuring. But one may feel unhappy about using this variable as an aid to factor interpretation—as in fact Cattell does. That is, though one may concede that in an exploratory study an investigator need not be crippled by low (internal consistency) reliabilities, there are doubts that he might be as cavalier about them as Cattell often tends to be. Of course, these remarks apply primarily to his more recent objective test studies—reliabilities of his ratings exceed those of most investigators, and his questionnaire reliabilities are as good as many of those achieved in the mental test area.

<sup>2</sup> His description of the requirements for a well-designed factorial study could well serve as a model.

<sup>3</sup> Sometimes he over-uses it! For example, in Tables 11-3 and 11-4 in his book, Variable 32 has corrected factor loadings approaching unity on more than one factor.

An explorer needs to define his domain. In the present state of personality research it is difficult to particularise so that it is better to roam widely. Hence Cattell proposes the *personality sphere* which must be sampled in a stratified way in the search for relationships and consequent theory. Cattell has found this concept so fruitful that he considers ways in which it could be expanded ultimately to become a 'space occupied by stimulus-response units,' having 'dimensions' capable of discovery in the same way as the 'dimensions of trait space' have been discovered. The different *trait modalities* (temperamental, ability, and dynamic traits) would constitute different spaces at 'infinite distance' from one another.

This is an interesting notion and there is no doubt that he has found the personality sphere a useful concept. But even aside from the assumptions that all relevant elements are included in the sphere, that exploration is the correct way to proceed, and that factor analysis is the appropriate technique, as Cattell presents it there are difficulties in the way of its becoming a research paradigm. He points out that many different aspects of response may be studied—e.g., speed vs. error. This implies different spaces and different dimensions for the various response aspects. And like the modalities, these spaces would all be at infinite distance from one another. All this augurs ill for the integrated dimensional psychology which he considers so necessary. And even within his own use of the modality spheres there seems an inconsistency. Being at infinite distance from one another, the modalities might not be expected to intercorrelate, and yet he reports significant (and plausible) correlations between some of the temperamental and dynamic dimensions. But perhaps the real point is that he may be showing why we may never expect an integrated dimensional psychology and that ultimately we may have to recognise that we will require different theories for each aspect of "response"!

To paraphrase Cattell slightly, the three *modalities* are distinguishable as follows: *Ability traits* are those upon which inter-individual variance derives from 'changes in the complexity of a situation'; *dynamic traits* derive their variance from 'changes in incentive'; and *temperamental traits* relate to residual variance, being defined by "aspects of response which prove to be independent of both complexity and incentive changes" (p. 812). Here is a useful conceptual distinction which may perhaps even become operationally possible. It is at least a marked improvement over most of the current ambiguous concepts of temperament. Pending the time when he may make the distinction more specifically, Cattell uses the term 'general personality trait' for those dimensions which are obviously neither ability nor dynamic.



Within the personality sphere there are three *media of observation* which produce: (a) life-record (L-) data; (b) questionnaire (Q-) data; and (c) objective test (T-) data. Cattell emphasises that questionnaires may yield either introspective or 'behavioural' data. He poses a problem here but is not entirely consistent in the solution he offers. If a questionnaire response is accepted as a statement of fact reflecting 'mental interior' then he conceives it as introspective data which is particularly prone to 'self-perception distortion' and to response instability according to testing conditions ('motivational lability'). But he insists that it is more proper to treat questionnaire responses as 'behaviour' to be interpreted according to their relations with other responses, not necessarily only questionnaire responses.

Apparent here is the not uncommon operational inconsistency of regarding response as reflecting something "more real" than a mere response. Cattell conceives Q-data as equally subject to 'self-perception distortion' even when 'behaviourally' interpreted! And when he discusses his Q-data factors he slips readily into 'mental interiors'! One may also wonder why he restricts this mental interior vs. overt behaviour distinction to Q-data alone. If there is anything to the distinction it would seem to apply equally to L-data—and, indeed, to much of his T-data. For example, when an observer rates a person as "behaving angrily" (L-data) does this necessarily mean that the person "feels angry"?

The criteria of an 'objective test' are that the subject does not recognise what *personality* dimension is being measured, nor how his response will be scored. In this sense, as with some items in Cattell's 16 P.F.Q., even questionnaires may approach objectivity. Being much more capable of measuring what the investigator intends, objective tests have the greatest promise in personality research. This is a somewhat surprising viewpoint from an 'operational' factor analyst whom one would expect to ascribe more to the "signs approach" than to the "samples approach" (Goodenough). If a specially constructed test does not load on the intended factor, does the fault lie in the factor interpretation or in the test? Perhaps Cattell would reply that it depends upon the ingenuity of the test constructor—and for test ingenuity he probably has no equal.

Cattell's approach has been to study one medium at a time, beginning with L-data because it is closer to real-life and is easier to interpret. Within each medium factors must be replicated.<sup>4</sup> Factor matching across replicative studies is aided by the *salient variable similarity index*. This is a non-parametric

<sup>4</sup> In his book, Cattell gives Table 3-1 as an example of replication between studies but its content does not agree with his description in the text!



statistic which, since it is expressed as a probability value, might better be termed "salient variable matching probability." Some of the factors may be termed "salient variable matching probability." Some of the factors may be termed "cooperative factors"—that is, factors which load on the same variables but reflect different source traits. One's difficulties in understanding this notion may derive from lack of experience. To those of equivalent experience to Cattell it may be obvious. But in the example to which he refers (4, p. 286), many investigators might well infer that there is only one factor of interpretative significance.

## II. General Personality Traits

Having identified factors in one medium three problems arise: (a) naming them and comparing them with previously discovered factors, including those by other investigators; (b) examining their generality across media of observation; and (c) establishing their independence of the particular population sampled. On the third issue, Cattell's procedure has always been to begin with adults, then to study adolescents, and finally children. On the second, he believes that the same factors are likely to occur with all media of observation (*principle of indifference of medium*). Cross-media studies present practical difficulties and so far all three media have not been included in one study. In those which Cattell has performed there has been no perfect cross-media matching and he suggests that this may reflect a real state of affairs—that, for example, Q-data factors represent 'thought rather than action.' Matching has so far been better between L- and Q-data studies than between either of these and T-data factors. Each study has included a second-order factor analysis and, surprisingly, some of the first-order T-data factors seem to correspond to second-order L- and Q-data factors. T-data may well be broader in scope, and not narrower, as one would expect.

Cattell's second-order studies are in many respects impressive. With L- and Q-data there has been only the one analysis within each medium, replication being achieved in each case indirectly by averaging the factor intercorrelations over five studies. The factor matching between the two media is remarkable.<sup>5</sup> Considering the novelty of his objective test approach to personality structure—Eysenck's work differs in aim and method and is not really comparable—Cattell's cross-matchings between two separate second-order analyses with T-data are also impressive, especially since the studies were replications, a more rigorous procedure than that followed with L- and Q-data. Cattell is well aware that factor intercorrelations vary with

<sup>5</sup> Readers of Cattell's book may suffer less confusion if they note that, in Table 8-1, M *Autia* should read M(-) *Praxernia*.

circumstances, especially sampling, and thus specifies that his second-order factors apply so far to adults only. But with the population specified in this way, his results suggest that second-order analyses may well produce results which are just as invariant as those from first-order analyses, and that the dependence of primary factor correlations upon experimental conditions is no more restrictive than the similar dependence of first-order variable inter-correlations. And, at least with L- and Q-data, the second-order factors appear to be just as interpretable as first-order factors. With T-data, however, it is another matter at this stage!

In all, his second-order studies go far towards weakening the prevalent skepticism about the utility of oblique factors. It is noteworthy, too, that second-order factors are no longer necessarily conceived as "super-ordinate." Some may be the products of the operation of first-order traits, possibly through "feed-back." In fact Cattell argues that the second-order L- and Q-data *anxiety* factor is caused by the six primary factors loading on it. But in doing so he is inconsistent with his own argument! He points out that if the primaries were causes they could not each contribute more than one-sixth of the variance (i.e., they could not correlate more than .41 with the second-order anxiety factor), and typically they should be uncorrelated. If they were effects of anxiety they would be more likely to be inter-correlated and they could load more than .41 on anxiety. In fact, the primaries meet these second conditions, yet they are interpreted as *causes*!

Eysenck (15) is also impressed by Cattell's second-order L- and Q-data factors. He complacently accepts them as confirming what he has argued for some time—that there are only two main factors, neuroticism and introversion/extraversion. But he conveniently overlooks that Cattell distinguishes between 'Neural Reserves vs. Neuroticism' (U.I.23) and 'Anxiety vs. Dynamic Integration' (U.I.24) and that *body-sway suggestibility* loads on U.I.23, whereas it is U.I.24 which Eysenck seems to equate with his own neuroticism factor. However, in Cattell's more recent studies (9, 11, 12) there is the difficulty for Cattell that in one of them (9) *body-sway suggestibility* loads more on U.I.24 than on U.I.23, and in another (12) loads negligibly on U.I.23. It is a pity that Eysenck has not reported in more detail the significant correlations which he states that he has obtained between measures of Cattell's introversion/extraversion and anxiety factors and his own introversion/extraversion and neuroticism factors. Considering the ambiguity of the relations between the factors obtained by these two important investigators of personality dimensions there is need for details on any clarification that may be offered.



On the problem of naming factors, Cattell suggests a *Universal Index* of factors. Each factor is given a number, with the letter prefix *L*, *Q*, or *T* according to the kind of data from which it was derived. Roman numerals are allotted for second-order factors. Ultimately, letter prefixes indicating the type of factorial study (e.g., *R*, *P*, *Q*) from which they were obtained, and letter suffixes indicating the type of population could be included. In its full form this index is somewhat extreme and premature, but the introduction of an index seems a sound suggestion and in the absence of any better index his might well be followed by all psychologists. Reference to factors by a number is certainly more convenient than by letters (e.g., French's letter symbols), and it avoids lengthy descriptions and the undesirable connotations which they often imply.

To assist interpretation of the factors, Cattell takes account of a mass of data on known associations between the factors and other variables. Less information is available on his T-data factors and his interpretations of these and their cross-matchings with L- and Q-data factors remain tentative. Major novelty lies in this T-data which constitutes a 'new world' which Cattell believes 'psychologists must be prepared to inhabit.' When he discusses the many factors obtained in each of his media Cattell impresses with his psychological insight and his fertility of ideas. He poses many problems for further research and amply demonstrates that a factor analyst may also be a *psychologist*!

A detailed analysis of his interpretations and his cross-matchings would be beyond the limits of this review and beyond the interests of this reviewer. But it is obvious that they are less impressive and more tentative than Cattell would often admit. If he were to provide more adequate descriptions of his objective tests he may be more convincing that rotation to oblique simple structure automatically provides psychologically interpretable factors. Objective tests may be the measuring devices of the future but without Cattell's insightful and detailed knowledge this is by no means obvious. And in his descriptions of associations which have been discovered between his factors and various other data, such as occupational proficiencies, parental attitudes, and so on, he seems often to have been "wise after the event." Correlations seem to have been calculated wherever possible and significant ones noted. Since he is so insistent that factors must be replicated to be acceptable it is strange that he appears not to demand cross-validation of these other relationships. He is not, of course, the only investigator who is sometimes unconcerned about the absence of cross-validation—Eysenck has not been overconcerned about it in his dimensional studies.



One thing is clear: Cattell has produced an impressive array of personality dimensions. Eysenck has produced an equally impressive but much shorter list. There is increasing need for research to relate the findings of the two. And, as Cattell suggests, this might preferably be performed by 'a third party.'

### III. *Principles and Uses of Factor Measurement*

Cattell regards the factor specification equation "as a more developed statement of the general stimulus-response formula" (p. 283). The factors represent dimensions of the organism and the factor coefficients (*situational indices*) are a quantitative representation of the psychological nature of the stimulus. As already indicated, Cattell's apparent identification of factors with antecedant causal conditions in this equation is difficult to accept. The specification equation has the special merit that it permits a mathematical synthesis of personality characteristics (including possibly all three modalities) which avoids the objectionable overtones of Gestalt holism. It is worth noting here that Cattell does not mistakenly identify this approach with the nomothetic approach, as does Eysenck (14).

To predict from the specification equation factor scores are required. These are best obtained from specially constructed *factor scales* for which he has developed special formulae for the estimation of reliability and validity.<sup>6</sup> Cattell believes that these formulae differ from those derivable from the Spearman-Brown formula because of differences in assumptions concerning correlations between the item-specific factors. Actually the difference lies in his concept of reliability—*dependability*, or immediate correlation of the test with itself. When reliability is defined as the correlation between equivalent forms of a test, the Spearman-Brown formula applies with both correlated and uncorrelated item-specific factors. When reliability is defined as dependability, the Spearman-Brown formula applies

<sup>6</sup> The formulae which he presents in his book contain a number of typographical errors as follow:

p. 291: In the second formula, the error term in the denominator should be a variance term, and the last formula should read

$$r'_{tf} = \frac{r_{tf}}{\sqrt{r_{tt}}} = \dots$$

p. 292: Interchange the formulae for Observed Validity ( $r_{tnf}$ ) and True Validity ( $r'_{tnf}$ ) and in the new Observed Validity formula amend the numerator to read  $n^2\sigma_e^2$ . In the formula for  $r_{tn_1tn_2}$  add  $n\sigma_e^2$  to the denominator. In the second last formula, amend  $r'_{tnf}$  in the denominator to read  $r_{tf}$ . In the last formula, amend  $r'_{tf}$  in the denominator to read  $r_{tt}$ . An errata sheet giving these corrections is available from the publisher.

only when the item-specific factors are correlated, as he says. This difference deriving from reliability defined as dependability with uncorrelated item-specifics is perhaps more obvious if the following formulae (which are identities derivable from his) are compared with the Spearman-Brown and its derivative for validity:

$$r_{tntn} = \frac{r_{tt} + (n-1) r_{tf}^2}{1 + (n-1) r_{tf}^2}$$

$$r_{tnf} = \frac{\sqrt{n} r_{tf}}{\sqrt{1 + (n-1) r_{tf}^2}}$$

Especially with personality traits, pure factor scales are difficult to achieve. Rather than score one item (or sub-test) on more than one factor as is done in some personality questionnaires, Cattell argues that it is preferable to use suppressors and points to the theoretical differences here between the orthogonal and the oblique situation. As he implies, maximum possible suppression of an unwanted factor is represented by the correlation between the wanted and the unwanted factors. Some additional points that may be shown are: (a) Suppression may actually reduce correlation between the scale and the wanted factor and decision on its use will require comparison between the resultant variance contribution reductions occurring in the wanted and unwanted factors: (b) The major effect of suppression may be not to increase correlation with the wanted factor but to decrease the unwanted factor variance contribution (7).

Cattell also sets out to clarify 'principles for evaluating the reliability and validity of actual tests in terms of source trait concepts' by relating 'item-centred concepts to source-trait oriented theory.' He indulges in a polemic on conventional psychometric theory (or 'itemetrics,' as he calls it) and contrasts it with 'factor-metrics.' He insists that 'itemetrics' has paid too much attention to reliability and validity, has often confused reliability with validity, and has failed to recognise that test homogeneity may be incompatible with good prediction from factor scores. He makes some good points but he tends towards overstatement. As does Guilford, he conceives validity to refer to the power of a test to predict something other than its own score. A score which permits many inferences has great 'breadth of validity' and in this sense factors have greater validity than tests, although one may doubt his implication that factor (or construct) validity involves less arduous validation work than more conventional test validation. He argues for the

development of some standardised way of reporting validity but in doing so tends to overstate the case for 'ideal' (corrected) as opposed to 'concrete' (actual) validity, overlooking that correction for attenuation should be used not to indicate 'how good the test is in predicting,' for in fact it is not that good, but to indicate what gain may be expected from improving test or criterion reliability. In fact, Cattell seems too attached to correction for attenuation.

Cattell also has much to say on reliability. His inclusion of *conspect reliability* (agreement between observers) is noteworthy. This has been neglected by most other authors. Favouring a conception of reliability in retest terms, he distinguishes reliability from homogeneity but clouds the distinction by inconsistencies which occur in his own terminology—having defined 'consistency' as the 'correlation of a test with itself' he later lapses into the more popular use of the term as internal consistency, or equivalence, or homogeneity. He gives the impression that Cronbach's *coefficient alpha* (13) requires all possible random splits for its calculation, whereas of course it represents the mean value that would be obtained if all the random splits were taken. And he also somewhat misrepresents Gulliksen's statistical requirements for equivalent tests, failing to point out that the requirement of equal means and variances derives from similarity of item-characteristics and not from equivalence of units, though, of course, similar item-characteristics would produce equivalent units by producing similar raw-score distributions.<sup>7</sup>

But of most importance is Cattell's contribution on *factor-pure scales*. Here he makes clear what is often overlooked—that a homogeneous test need not be unifactorial. He conceives homogeneity to refer to 'vector purity,' and this vector may be factorially complex. He implies a distinction between a factor common to the items in a test, and a factor common between tests. In his use of the term, homogeneity refers to a single common factor in the former sense—a factor which may be specific in the latter sense—and he argues that excessive attention to homogeneity may produce such narrowness of content that the test may become a measure of a psychologically specific factor, i.e., a specific in the latter sense. In all, Cattell makes a serious effort

<sup>7</sup> Some other minor weaknesses on this material in his book are: There are obvious typographical errors in the last three formulae on p. 350, and on the same page his use of 'probable error' seems an anachronism in such an advanced statistical thinker. His use of the symbol  $\sigma_t^2$  for 'observed or true variance' could be confusing—he obviously means 'total variance.' And for the *phi-coefficient* to have a maximum value of unity does not require, as he states, that the items being correlated be both of 50 per cent difficulty, but merely that they have the *same* per cent difficulty.



at clarification of some confusions in test theory, but it is weakened by his over-stressing his itemetrics-factor metrics distinction, by his equation of homogeneity with "unidimensionality" (which term he does not use), and by his omission of sufficient attention to the difference in aims between measurement and prediction.

It seems preferable to use three distinct terms for three distinct concepts. *Homogeneous* tests are those with high item intercorrelations. They are internally consistent. Each item is a reliable measure of whatever is being measured. Error variance is low. But the number of common factors among the items may exceed unity. *Unidimensional* tests are those within which the rank of the matrix of item intercorrelations is unity. Among the items there is a single common factor. The item intercorrelations may actually be low, in which case error variance is high—each item measures the same single common factor but with considerable error. However, as Cronbach (13) has shown, provided the test is not short and provided there are not only a few common factors among the items in addition to the general factor (i.e., provided the test is not what he terms a "lumpy" test), even with low item intercorrelations the general factor rapidly summates to contribute most of the variance so that the test becomes "interpretable"—that is, it tends towards unidimensionality. This distinction between homogeneity and unidimensionality seems to resolve the paradox implicit in Cronbach's findings—that in the more conventional sense a non-homogeneous test (with low item intercorrelations) could be a homogeneous test (have a high *coefficient alpha*, indicating that the general factor accounted for most of the variance). *Unifactorial* tests are those which each measure one single common factor only, the factor in question being a factor common *between* tests. They need not be homogeneous—error variance may be high. Since the single factor common among the items of a unidimensional test may be factorially complex in terms of factors common between tests, a unidimensional test may not necessarily be unifactorial. And though it will tend to be unidimensional, a unifactorial test need not be—it could conceivably involve unknown common factors.

*Measurement* seems to require homogeneity and unidimensionality, but it does not seem necessary that the device be unifactorial. Weight, for example, would be a homogeneous and unidimensional measure, but factorially complex. Had Cattell recognised these distinctions his argument would have been clearer. He emphasises that good *prediction* requires a heterogeneous predictor and tends to imply that this is the sole aim, and that homogeneity (in his sense) is not necessary, nor even desirable. But in fact unidimensional

(and preferably homogeneous) tests are needed for factor identification. For example, "blood pressure" could hardly be used as an aid in factor identification unless he were confident that it is measuring "blood pressure" (a unidimensional attribute) and preferably were confident that errors of measurement are low (a homogeneous measure), regardless of the source traits that may be involved (its factorial complexity). Moreover, the ideal factor scales which he proposes would each consist of a unifactorial (and unidimensional) composite of unidimensional (and preferably homogeneous and unifactorial) sub-tests. In practice, of course, the sub-tests would be factorially complex and suppressors would have to be introduced. And only if he were predicting a factorially complex criterion would a set of scales providing a factorially complex measure be required.

Conceiving terms in this way seems to arrive at the conclusion which Cattell is seeking, but without the need for his 'itemetrics' attack and at the same time maintaining the distinction between the unidimensional aims of measurement and the factorially complex aims of prediction. As it is, Cattell arrives at a similar conclusion to that of Cronbach on "homogeneity" (but for different reasons) and one can agree with his protest against excessive attention to "homogeneity" (but conceived in terms of high item inter-correlations), although not with his implication that it may even be an undesirable aim. And it is clear that Cattell has accentuated the complexity of the relations between factor theory, psychometric theory, and measurement aims in practice, and has made an important contribution in this area.

Cattell believes that 'factor-structured measurement' also contributes to the problem of *personality typing* which is conceived as the 'complex task of representing the whole person in terms of dimensions.' He distinguishes between a *configuration* and a *pattern*, the distinction resting on whether the elements are ordered or unordered. Within a pattern there are *general purpose* vs. *special purpose* types, corresponding to the distinction between discovering types and using types for prediction. The former involves the use of matched-element profiles, while the latter develops emergent-functions, i.e., mathematical predictive formulae. In all cases a type is represented by a profile of high frequency. It is difficult, however, to conceive types as *modal points* occurring on frequency distributions of emergent-function predictions. One can, of course, categorise at any point on a continuous frequency distribution—e.g., "a highly intelligent type." But experience so far does not suggest that there will be modal points. While granting that the form of any distribution is a function particularly of the item-characteristics



in a test, evidence so far does not support this aspect of Cattell's suggestions for systematising the problem of personality types.

Cattell believes that the personality sphere, as represented by the primary factors, solves the sampling of variables problem in the search for personality types—including that for trans-cultural types to the extent to which the primary factors prove to be trans-cultural. The next problem is that of the sampling of persons. Only if the elements in the profile are applicable to all persons in the population sampled can they be used in a generalised search for types in that population—that is, only if they are *type-homogeneous variables*. This distinction between type-homogeneous and type-heterogeneous variables is perhaps clearer by example. If Americans and Chinese comprised the population, then type-heterogeneous variables might better be used and could lead to American vs. Chinese profiles. Examination of the profiles would indicate the elements common within Americans and those common within Chinese. These elements would be type-homogeneous and could be used in the search for types within Americans and within Chinese separately. This procedure might allow successive refinement of classification and of prediction within the classes so derived. The role of sampling of variables and persons in so-called Q-methodology is now well recognised, perhaps particularly because of Cattell, and here he provides even further emphasis and development. It is not clear, however, why Cattell insists that cluster analysis is the appropriate method with type-homogeneous variables, while factor analysis must be used with type-heterogeneous variables.

#### IV. *The Measurement of Motivation*

Cattell's research in the 'dynamic modality' has been less prolonged, and less intensive than that on general personality traits but he is confident that he has achieved enough to permit 'a radically new approach' to motivation which is to be contrasted with the lack of measurement typical of clinical studies and with the lack of attention to 'motivational structure' characteristic of learning experiments. And, one might add, an approach which deals with *human* motivation. Whereas motivational study has so far been restricted by the absence of adequate measuring instruments (and he would seem to include McClelland in this category), now 'a whole new development of precise concepts, effective for prediction and reliable diagnosis, begins to open up'. This self-assessment by Cattell of his 'new approach' is over-enthusiastic but it is clear both that he has shown 'objective measures of motivation' to have considerable promise and that his 'new approach' is so fertile in ideas and so novel in outlook as to demand far more detailed and systematic analysis than will be possible here.



His approach to motivational study has been analogous to that on personality traits—do not start with preconceived notions of motivational structure, but discover the structure by sampling within a sphere of motivational units. All behaviour is motivated, including every specific action, and the motivational unit is an *attitude*, defined by the paradigm: "In these circumstances I want so much to do with that." An attitude is an inferred tendency to action in relation to an object, and is a conative-affective habit, as contrasted with an ability which is a cognitive habit. *Interest* is the term applied to the intensity of the action-tendency, to the 'so much' in the paradigm statement. This seems a meaningful distinction between two terms which have so often been confused. Attitude, as he uses it, must not be confused with the term used by social psychologists who always ascribe to it a "for or against an object" connotation which he insists is meaningless. But surely "for or against a *course of action* in relation to an object" is always implied in this usage?

Attitudes may be represented spatially as vectors with factor coordinates. The factors may be *ergs*, which are innately determined dynamic source traits, or *engrams*, which are culturally determined sentiments and complexes, although in practice this distinction is difficult to make and is often made semi-intuitively. In the search for dynamic structure there are not the same opportunities for arbitrary reduction of the attitude sphere to workable dimensions as exist in the personality sphere, so that representative sampling is not so possible and there must be preconceptions on those attitudes included in the analysis. The influence of McDougall in Cattell's theorising and in his choice of attitudes is readily apparent, and the list of ergs and sentiments (engrams) he has discovered bears close resemblance to that of McDougall. In fact, on motivational structure Cattell may have achieved no more than could have been achieved by natural observation—indeed as by McDougall. And the factor analyses may merely have confirmed the soundness of McDougall's observations. Rather than a theoretical contribution, Cattell's real contribution seems to have been methodological. He has shown that factor analytic procedures can be applied to *objective measures of human motivation* to produce a motivational structure like that which non-quantitative psychologists have talked about for years and the very redundancy of his results bears witness to the efficacy of these measurement procedures. His contribution, then, has primarily been to develop and to demonstrate the potential of *methods of motivation measurement*. Eysenck (15) seems to fail to appreciate this when he criticises Cattell for "defining drive" in terms of a factor specification equation, instead of with a Hullian-type equation

(whatever this may mean). Cattell's specification equations do not *define* ergs. They state how the strength of a specific attitude may be *assessed* and express the ergic (drive) components of that action tendency. And there is nothing peculiarly "factorial" about his *ergic tension equation*—if anything at this stage it is purely conceptual. The special role of factor analysis has been solely to summarise and to objectify the behavioural covariation from which generalised motives have always been inferred.

When Cattell is measuring attitudes he is not actually as operational as his concept of attitude would seem to require. Instead of an attitude being inferred from actions in relation to an object, the attitude is defined and is then measured by the expected outcomes of its operation in the prescribed situation. For example, possessing the attitude "I want to make love to a beautiful woman" will make a person remember stimuli associated with that action, and the greater his memory for love-making stimuli (compared with that for non-love-making stimuli) the more intense the attitude in that person (relative to his other attitudes). And if this attitude, when measured in a variety of ways by similar inferences, co-loads on a factor with other sexual attitudes, then this factor represents the *sex erg*. An interesting sidelight here is Cattell's discovery that "movie-going" co-loads with sexual attitudes among college students but not among married males!

But that Cattell's measurement methods and his theory are not strictly in harmony does not depreciate his demonstration that plausible and meaningful results may be obtained with *novel* measurement devices. His list of *principles of motivational measurement* (pp. 465-471) reflects his breadth on knowledge, his insight, and his fertility of ideas, and will be a useful source for those contemplating research in this area.<sup>8</sup> He has incorporated all principles which have had the sanction of psychologists as possible indicants of motivation. But his examples of actual measurement devices contain a number of errors. Since these errors could be misleading and are probably not detectable without a detailed knowledge of his devices they perhaps better be itemised:

*Device 5: Decision Time:* 'Preference' items have never been used for Decision Time measures. They were used for measuring 'Conflict' but this variable had too low reliability to be used in any factor analysis.

*Device 8: Pulse Rate Change to Threat:* Reference to Device 5 should read Device 6, but in any case Pulse Rate Change has unknown factorial structure.

*Device 11: Retroactive Inhibition:* The procedure outlined would obviously not provide a measure of retroactive inhibition and does not

<sup>8</sup> This list is not so far available in any other literature.



describe, even partially, any procedure used for that purpose. Actually it is a confused account of a procedure which has been followed for 'Visual Distraction.'

*Device 10: Auditory Distraction:* The procedure given for measuring 'Religious Sentiment Strength' is that which was used for 'Simultaneous Competitive Inhibition' which was not included in any factor analysis.

Since there are no external criteria of motivation strength, Cattell uses 'validation against the pool'—that is, factor analysis of the device intercorrelations for any one attitude, or when averaged over a number of attitudes.<sup>9</sup> But instead of the device intercorrelations yielding only one factor they produced at least five factors which he terms *motivational component factors*. In the absence of independent criteria, how are these known to be motivational factors? Because the mode of scoring (performative) at least precludes their being abilities.

Following upon his earlier distinction between *normative* and *ipsative* scoring (2) Cattell now clarifies the distinction and introduces a third form—*performative*. Normative refers to scores expressed as deviations from the group mean; ipsative to deviations from the subject's mean over occasions; and performative to deviations from the subject's mean over tests. He continues in his book to use the term ipsative for attitude scoring because the scores represent deviations from a subject's mean (over a number of attitudes) for that particular measuring device. In the absence of suitable measures to allow comparisons between subjects on the strength of any one attitude this seems a necessary procedure. However, the attitude scores which become expressed as deviations from the subject's mean attitude score are actually obtained from different tests, at least in the sense of having different content, though within the same measurement device. An analogy would be a number of verbal intelligence tests, all having different content but the same format. Hence it seems more consistent, as he now agrees, to use the term *performative* for attitude scores derived in this way, thus preserving his distinctions given above: normative-persons; ipsative-occasions; performative-tests.

Actually the role of the mode of scoring in Cattell's motivational studies is complex and difficult to evaluate. Studies are under way on the relations between the different possible scoring procedures. At this stage it seems that the only procedure which is generally valid for performative scoring would be: Assuming that rows refer to subjects and columns to attitudes, normalise

<sup>9</sup> The study which he reports (p. 453f) used four attitudes, and not five as he says, and his description of the procedure is inadequate.



the columns and then normalise the rows. Usually this latter will not be possible because the number of attitudes will be too few, and if so mere standardisation of the rows (without normalising) will not necessarily produce additive units in the columns which are, of course, assumed in subsequent treatment of the column scores. It may be argued that this would be no more a restriction than typically applies in any column of scores (and disregarded in achieving the above normalisation of the columns), but there is a difference in the degree of immediate meaning which normative scores and performance scores convey.

Cattell makes much of these motivational component factors. It may well be that there is something to them—in fact on-going research (8) suggests that there is. But at the stage of his writing his book Cattell seems to have made too much of them in the light of the evidence then available. Considerable insight is required to follow the *conscious id, realised ego, ego ideal, unconscious physiological interest, and repressed complexes* interpretations which he gives them, although he does admit that these interpretations are merely tentative. But at the second-order level, where factors *Beta* and *Gamma* form the 'integrated self-sentiment' and *Alpha, Delta, and Epsilon* form an 'unconscious, impulsive, unintegrated structure,' they do look good! Notwithstanding doubts on their interpretation, however, he believes that the factors themselves are "real" and that they show that interest intensity is not a single dimension but requires measurement on a number of components, at least the two second-order components. This procedure was followed in his analysis of motivational structure. But closer scrutiny raises many doubts. Firstly, reference to the original studies (6) shows that the cross-matching between analyses is questionable for *Beta* and *Gamma*. Secondly, PGR and physiological measures are used in the interpretation of both *Alpha* and *Delta*, although in each factor their corrected loadings approach unity! Thirdly, except for PGR, which has a low loading, the measures loading on *Epsilon* are experimentally dependent. Lastly, the physiological changes involved in *Delta* are known to be physiologically interdependent and there is no evidence that they are *interest* measures. One might add that further doubt on his interpretation of the factors is cast by his inclusion of the 'Expectancy' device in his discussion of *Delta* when in fact it loads on *Beta* and *Gamma*!

As Cattell points out, operational distinction between traits discovered in the ability, temperamental, and dynamic modalities is at present and perhaps even ultimately impossible because behaviour may be viewed from all three aspects. So far he has made only two 'cross-modality' studies. In

the one reported in his book the correlations obtained between temperamental and dynamic traits are in the expected direction but are too small to conclude identity, even after correction for attenuation. Some of the correlation could be due to similar methods of measurement; e.g., 'preference' items as motivational measures are highly similar to a number of items in the 16 P.F.Q. The other study (9, 11, 12) was directed at a different problem and the 'cross-modality' data was too incidental to offer any contribution to inter-modality relationships. There is need for more research in this area, especially, for example, when we notice that the 'self-sentiment' occurs as both a temperamental and a dynamic trait, and that both 'ego' and 'super-ego' are included among both the temperamental and motivational component factors.

But while operational distinctions may be impossible, theoretical considerations are not. At the stage of his writing his book Cattell was inexplicit about the possible relations between the motivational component factors and the traits in the three modalities, but he has since corrected this omission (5). In his book his views implicitly seem to be: Behaviour derives from an action-tendency (attitude). It has certain characteristics (temperamental expression), and it occurs with a certain efficiency of outcome (ability). Covariation within each of these allows the respective inference of the three kinds of trait. Now this action-tendency, behaviour, and efficiency of outcome constellation may be consciously and purposefully integrated by the ego, or may be less integrated and more impulsive in quality. It seems to be such an impulsive vs. integrated qualitative role that Cattell is implicitly ascribing to his second-order motivational component factors. In his later article (5) Cattell suggests a number of solutions to the 'riddle' of the relations between the dynamic traits and the motivational component factors, though he still omits explicit consideration of how they relate to the other two modalities. None of these solutions is identical with the above inferences from his book but his preferred solution on the second-order motivational component factors is not inconsistent with them. He suggests that the integrated second-order motivational component factor represents the way of measuring engram (M) factors, and the unintegrated factor that of measuring erg (E) factors in his specification equation for interest strength in a course of action. And at the first-order level he suggests possible equivalences between the motivational component factors and the various terms in his ergic-tension equation.

All of this has a certain plausibility but it remains speculative at present. Pending further evidence to support his interpretation and in the light of evidence available since the book was written, preferred interpretations of the



first-order motivational component factors would seem to be that they represent test and behavioural *media* through which attitude expression may occur and be measured—verbalisations to questionnaire-type material for *Alpha*; interest induced cognitive productivity for *Gamma*; skeletal-autonomic expression for *Delta*; with *Beta* and *Epsilon* remaining questionable both in “reality” and interpretation, the latter apparently deriving primarily from statistical interdependence between the measures involved in it.

Cattell's ‘radically new approach’ to motivation lays the foundation for ‘a quantitative psychoanalysis’ and for ‘a dynamic calculus of conflict’ which provides ‘an integration of the total personality.’ For this purpose, Cattell ‘clarifies’ existing terms, introduces new terms, ‘systematises’ the concepts of conflict and integration, derives equations for ergic tension (drive strength), conflict, and adjustment, and suggests possible measures of integration. Some of his clarifications and systematisations fall short. For example, with both frustration and conflict he fails to distinguish between states of the organism and characteristics of the situation and uses the terms in both senses. And his clarifications of adjustment and integration are unconvincing—adjustment seems to be represented by full goal-satisfaction!

But it is with Cattell's ‘dynamic calculus’ that one's difficulties are most acute—and these difficulties are not resolved by his later more detailed treatment of this topic (5)! Partially they derive from the complexity of the material, especially the role of performative scoring in the actual use of motivational measures for individual assessment and diagnosis. Cattell recognises this problem and it is at least implicit that one must recognise that only *intra-individual*, and not inter-individual comparisons are possible with dynamic measures. And, similarly, it is at least implicit that the necessary values (factor loadings) for his measures of conflict may be obtained from P-technique only—i.e., from measures on a number of attitudes with a number of devices for the one person over a period of time. Evidence from the one and only study (16) which has used a measure of conflict obtained as Cattell suggests gives some support (but not much!) to his belief that ultimately it may be more effective than the clinician's more ‘subjective’ assessment, but clinicians may well be skeptical whether the doubtful improvement would warrant the testing time involved, and even perhaps that the resultant measure is one of conflict!

For any one attitude, Cattell suggests that the sum of the squares of the negative ergic (or engram) factor loadings will indicate the degree to which the expression of that attitude is inhibited by those ergs (or engrams)



with the negative loadings, and gives a way in which this measure may be converted to a percentage of the 'total interest-energy' involved in that attitude (the sum of the squares of the positive and negative loadings). Aside from the problem of whether sampling of attitudes is adequate to produce all the ergs involved—and he recognises this problem (5)—provided this procedure is restricted to one attitude it does not seem implausible as a concept, though there is still the procedural problem of testing time already mentioned. A negative ergic loading means that when that erg is strong (relative to the person's other ergs) then the interest strength is low (relative to other attitudes). In this sense the presence of positive and negative ergic loading indicates conflicting ergic tensions. But one may equally interpret the negative loading as indicating that *low* ergic tension is associated with *high* interest strength! Cattell would probably regard this as psychologically implausible, but its omission as a possibility well illustrates his penchant for *causal* interpretation of factors.

But it is implicit in the book, and later made quite explicit (5, 16) that this measure is not restricted to one attitude, but is summed over a number attitudes. In this sense, the greater the number of attitudes having contrasting ergic (or engram) loadings the greater the degree of conflict. The clinician may well doubt that intense conflict is necessarily a generalised conflict. And, from P-technique, the 'variance' which the conflict measure would indicate would be variability over time in the relative standing of the ergs (or engrams) within the person's ergic system. The clinician's concept of fixated conflict does not seem to involve such a notion of variability. And, difficulties arise for his measure from "not wanting" to perform an action. Within Cattell's vector model a negative attitude is represented by an attitude vector in the negative quadrant—that is, by a vector having negative loadings on all ergs concerned. By his conflict measure this would automatically represent a high degree of conflict, whereas in fact *on that attitude* there would be no positive loadings with which the negative loadings could be in conflict! Perhaps, then, it is not surprising that Williams' study (16) only 'partially confirmed' the validity of this conflict measure.

#### V. *The Measurement of Personality Change*

Cattell insists that personality study must take account of changes over time and, as usual, conceives the task to be to develop measures, to find 'functional unities,' and to provide interpretations. In his review of what has been achieved and what might be achieved there are plenty of novel ideas and much scope for research. He distinguishes between *reversible effects*

(oscillation, function fluctuation, seasonal and other rhythms, physiological and psychological states) and *trends* (learning and maturational changes). For each he describes the factors which have been obtained and the trends which have been observed. A few examples will suffice here. Anxiety is a *state-trait*—that is, it is a trait because it varies between individuals, and a state because it varies within individuals from time to time. Age trends are towards low anxiety and towards decline in *fluid* but not in *crystallised* intelligence. Since individuals grow old at different rates, instead of chronological age, a physiological aging factor should be used as the criterion of age. This suggestion has interesting possibilities.

Particularly appropriate for investigating personality states are *P-* and *O-techniques*, supplemented by the *condition-response* design and *T-* and *incremental-R* techniques. Since a considerable time lag will occur between changes in conditions and the completion of a testing programme one cannot share Cattell's faith that incremental-R techniques and the condition-response design are *equally* as effective as manipulative univariate experiment in studying causation. He strongly believes that there should be more P-technique studies and his suggestions on the use of P-technique for the study of psychosomatic relationships seem particularly promising. His study with Cross—one of the most interesting studies performed in his laboratory—which showed ergic variation with daily changes in events well illustrates the potential value of P-technique, but demands on the subject's time are such that this type of study will probably always be rare.

Cattell relates the factors that have been obtained with these alternative designs with those obtained by R-technique with L-, Q-, and T-data. Some of his matchings are even more tenuous than he admits; e.g., that of PUI 5: Adrenergic Cyclothymia with UI 19: Critical Practicality. And one's doubts on these cross-matchings are not improved when one refers to more recent results (12), especially when one finds that two variables, which according to Cattell (p. 661) load in these later studies on UI 24: Anxiety, in fact do *not*—viz. low increase in heart rate to startle, which did not load on UI 24; and greater annoyability which was not in fact included in the analysis!

## VI. *The Practical Applications of Structured Measurement*

Cattell strongly criticises the use of 'tailor-made measures' in clinical and industrial psychology and insists that good taxonomy and prediction may be achieved only by measurement using established dimensions. For example, industrial psychologists might use the dimensions he has found in



the three modalities to set up an 'employee endowment file' and a 'job situation file' and select employees by appropriate matching. And in setting up the job situation file they might use both 'job activity analysis,' which is the procedure usually followed, and 'job personality analysis.' This is a novel distinction and Cattell offers some suggestions on job personality analysis which should be followed up.

There is much point to the criticisms which Cattell makes of current measuring procedures in applied psychology but they might have more favourable impact if some of the suggestions he offers were more realistic. Some of the tests which he nominates for applied use have yet to be constructed, while others have yet to have their predictive value demonstrated. For example, he has yet to show that his objective-test factor UI23: *Neural Reserves vs. Neuroticism* differentiates normals from neurotics. His sole evidence here is that of Eysenck and its relevance depends upon equivalence between UI23 and Eysenck's *Neuroticism* factor, an equivalence which rests mainly on loadings on body-sway suggestibility. And the predictive value of his UI24: *Anxiety* is limited to the demonstration of a low correlation with psychiatrist's ratings of anxiety in one study only (9, 10).

Except for their use to provide additional research data (and he does emphasise this usage), there is little justification for Cattell's recommendations at this stage—apart, of course, from the 16 P.F.Q. and tests derived from a selection of scales within it, such as the I.P.A.T. Anxiety Scale. And for industrial use even these questionnaires have the 'motivational lability' limitation, as in fact do all questionnaires.

More in the way of "criticism" than of "appreciation" may seem to have been offered here. But when a psychologist has as much to offer as does Cattell there inevitably must be much that may be criticised, and this especially when he is a 'pioneer . . . exploring new territory . . . in a vital area of research.' Everyone interested in personality study has been influenced by Cattell in the past and his influence will be even greater in the future. But it is as well to point out those methods and those areas in the 'new world of personality structure' which seem likely to have the most promise. Perhaps Cattell himself provides the most appropriate conclusion: "It may be true that the exact outlines of the . . . (elements of this structure) will require revision, and that a few of them are merely tenuous ideas, clothed in just sufficient factual demonstration to leave no doubt that they are worth further investigation. Collectively, however, they prove beyond cavill the enormous effectiveness and representativeness of the factor analytic model" (p. 281).



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